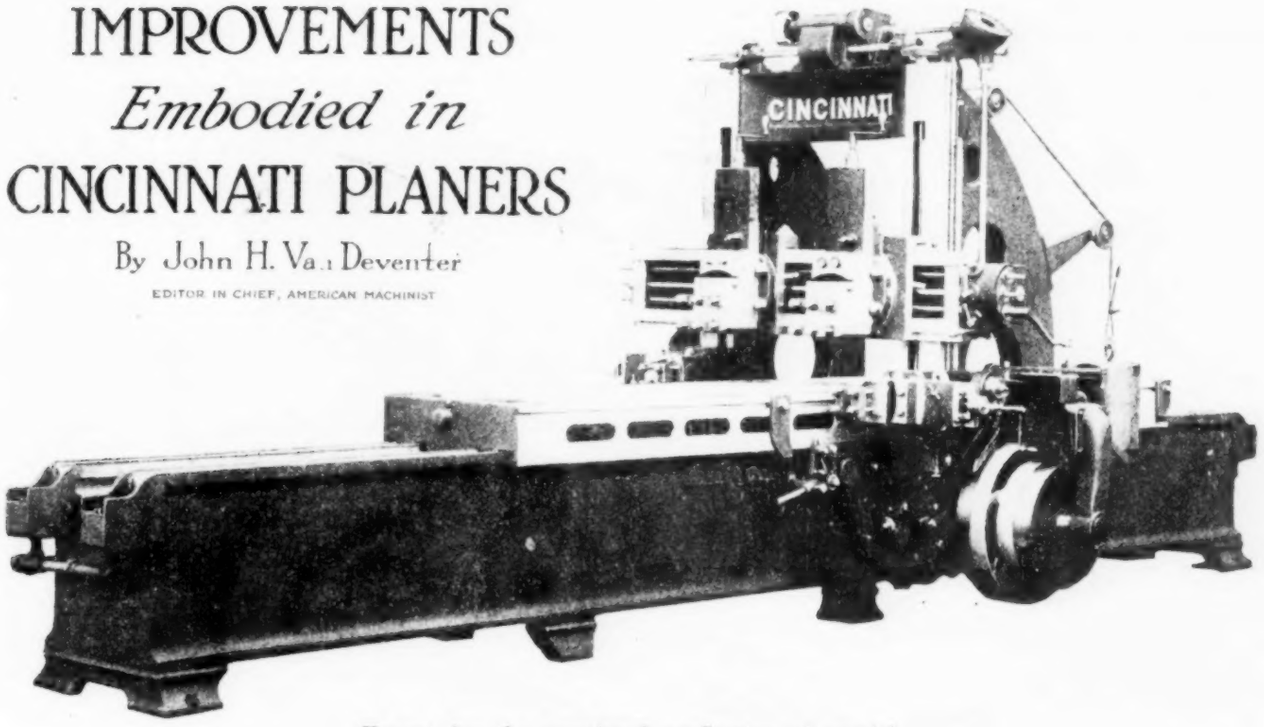
American Machinist

IMPROVEMENTS *Embodied in* CINCINNATI PLANERS

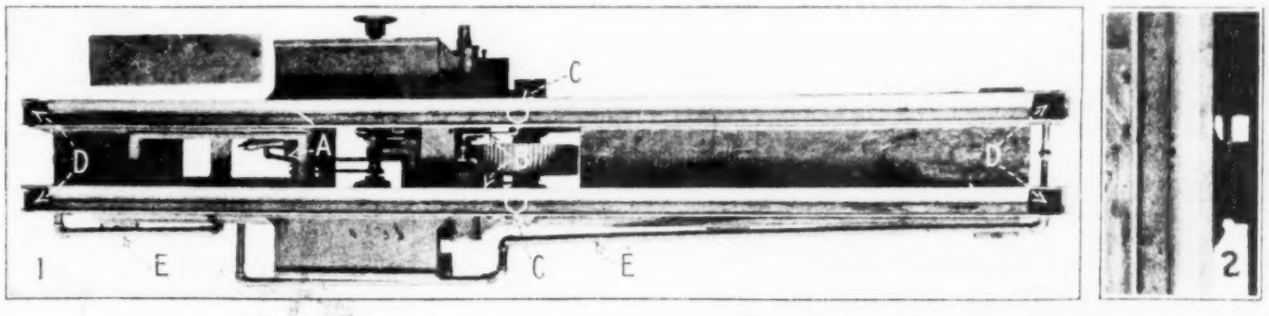
By John H. Van Deventer
EDITOR IN CHIEF, AMERICAN MACHINIST



Except for the occasional production of special-purpose planing machines and the development of occasional features which have been considered as "extras," there have been comparatively few changes in the design of our old shop standby—the general-purpose planing machine. The embodiment of forced lubrication, quick power traverse, herringbone gears, box-type beds and tables, and other improvements in a standard planing machine, as described in this article, is therefore of unusual interest to the machine-tool-using world.

INDIVIDUALLY, planing machines have covered a good deal of ground in the past ten years; collectively, while not standing still, they have undergone less change than any other type of machine tool. There is far less difference in general appearance between a planing machine of 1909 and one of 1919, than between boring mills of the two periods, or lathes, or milling machines, or even drilling machines. Just why this should be, it is difficult to say, for the planing machine is as universally used a tool as can be imagine. It has been fundamental to peace-time industry and the great demand for planing machines during the war emphasized their essentialness to war industry. Perhaps the reason for the lack of radical change in planing machine design lies in the fact that the planing machine has always been in its general features a well-designed tool. It has been harder for the present generation of designers to "put one over on Grandpa" in the matter of planing machines than with most any other tool.

This fact makes the embodiments noted in this article which deals with the new line of planing machines



FIGS. 1 AND 2. FORCED LUBRICATION OF THE WAYS IS A COMMENDABLE INNOVATION

produced by the Cincinnati Planer Co., of Cincinnati, Ohio, of particular interest. It is true that a number of these features have been in existence for the past two or three years, and available as "extras." The average user, however, is usually willing to accept the each V. These oil holes are more clearly shown in Fig. 2, which shows an enlarged portion of one V. Special grooving in the table Vs carry the oil to the end pockets *D* from whence it is returned to the reservoir and pumped by means of the pipes *E*. This

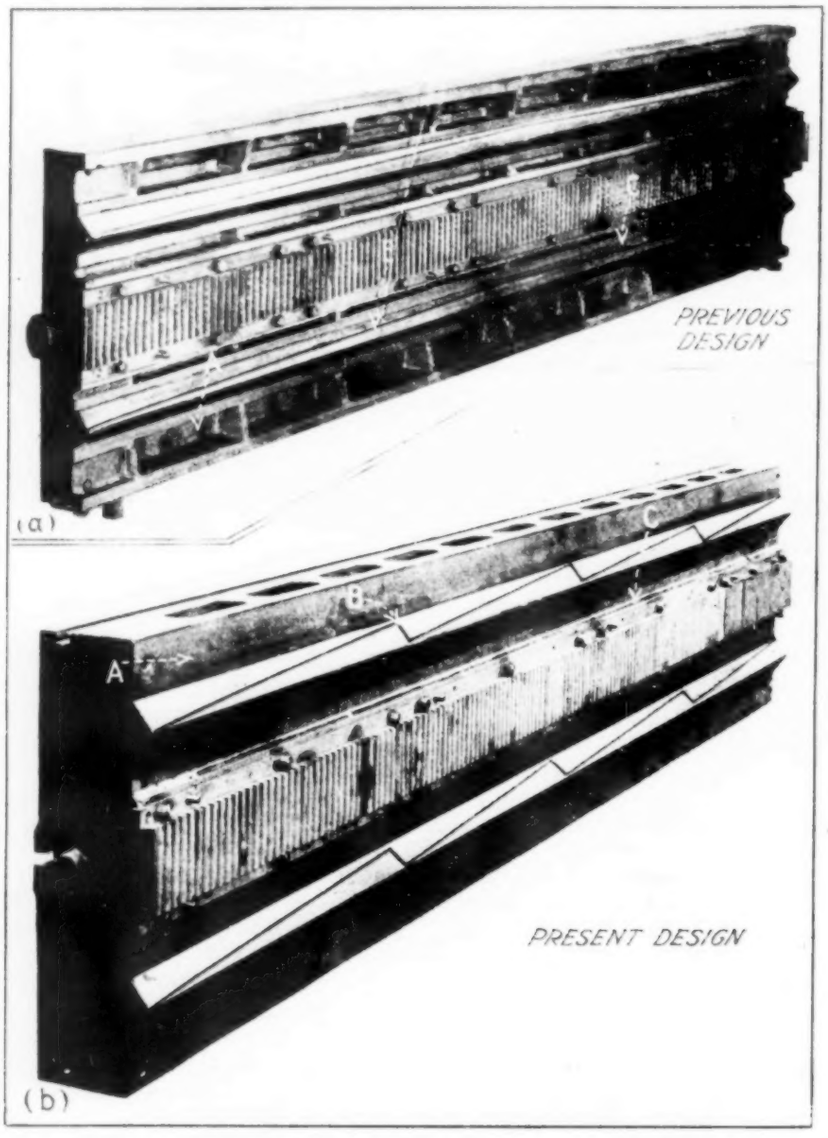


FIG. 3. BOX TYPE OF TABLE IS DESIGNED TO PREVENT PEENING AND ADDS STIFFNESS

A and *C*, box sections in present design replace previous channel sections; *B*, note difference in oil-groove layout for forced lubrication.

manufacturer's implied definition of an extra as something not regularly needed, so the inclusion of such features as forced lubrication, quick power traverse, herringbone gearing, box-bed and table construction, etc., not as extras but as part of the regular design, implies on the part of the manufacturer a higher conception of the duty and functions of his product.

One of the most interesting innovations is the forced lubrication of the Vs, by which oil under pressure is circulated from a central reservoir to both Vs at a central point and distributed thence outward to return pockets at the ends of the bed. The method of doing this is shown in Fig. 1. The positively driven oil pump is located at *A* and discharges through pipes *B* to the oil holes *C* at the bottom of the middle of feature of forced lubrication not only provides more bearing surface through the elimination of oil roller pockets, but insures adequate lubrication on short stroke under conditions that might result in cutting where roller lubrication is depended upon. Incorporated in this force-feed system of oiling is a means of twice straining the circulating oil through fine-mesh strainers before again delivering it to the Vs, thus insuring clean oil at all times.

All metal subjected to repeated blows has a tendency to distort or peen and the planing-machine table is no exception to this rule. The effect of this peening action is to draw up the central portion of the planing machine table and this particularly where considerable short-stroke work is done at this part of the table.

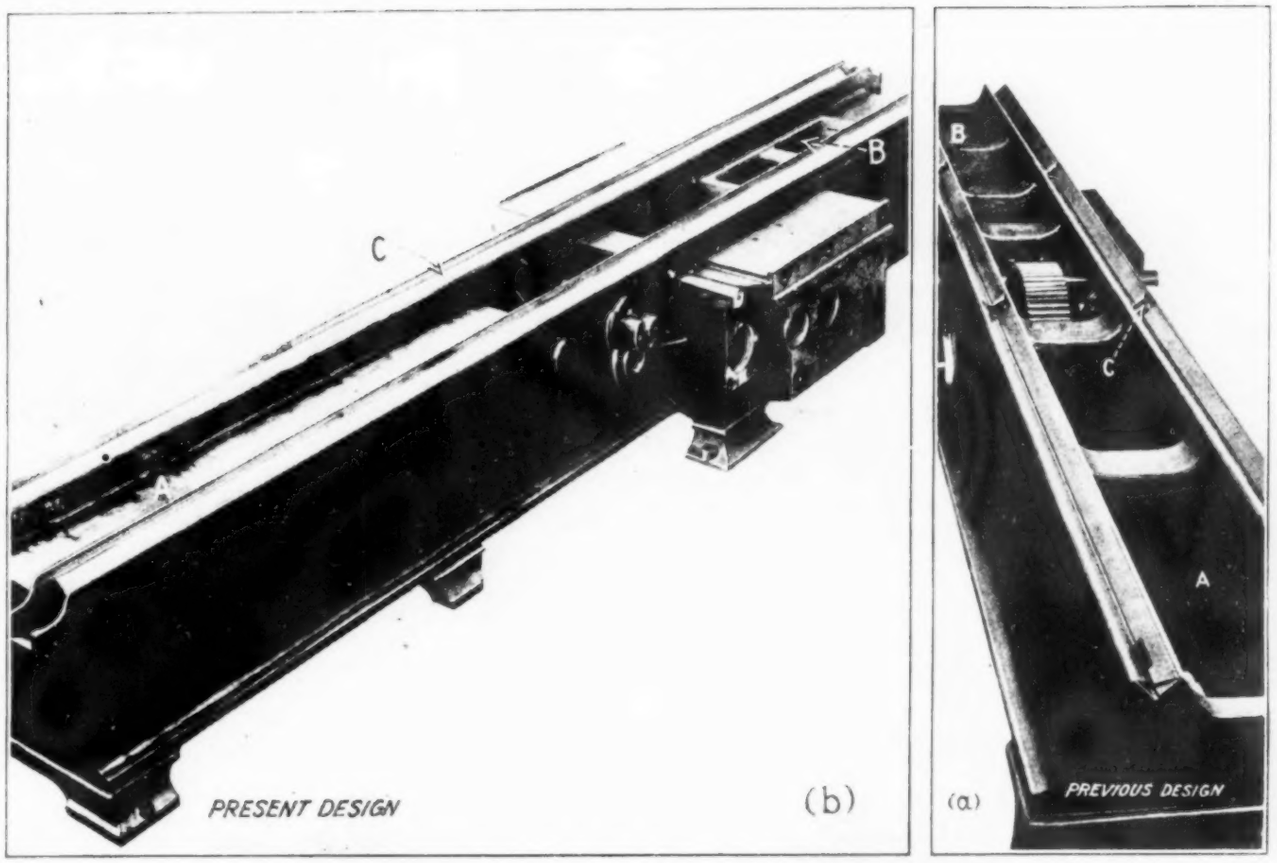


FIG. 4. CLEANLINESS AND RIGIDITY MARK THE NEW BED OUTLINES
A and *B*, previous open spaces between ways now ceiled over; C, note absence of friction oiling roller openings in present ways.

The resistance to this action depends somewhat on the quality of metal employed but more upon the stiffness of design. Fig. 3 illustrates the new standard box-type table and shows how it differs from the former design. It will be noted that box sections instead of channel sections are employed at *A* and *C*. This new design necessitates the compression of the bottom web of metal before the peening action can result in distortion. The box design, therefore, is extremely rigid under all conditions.

At *B* is shown the special form of oil grooving provided to distribute oil under the system of forced lubrication described in a preceding paragraph. The short right-angle steps in this grooving aid in sweeping the oil the full length of the Vs. T-slots in this table are planed from the solid and stop holes are drilled and reamed. These holes do not, however, extend through the bottom web of the box section and, therefore, dirt and chips are prevented from falling through the holes into the ways and gearing.

The box type of construction has also been adopted for the bed as well as the table. Heavy T-shaped girths at short intervals tie the walls securely together. Fig 4 shows the present design of box bed as compared with the previous design. The girths at *A* and *B* not only serve to prevent the accumulation

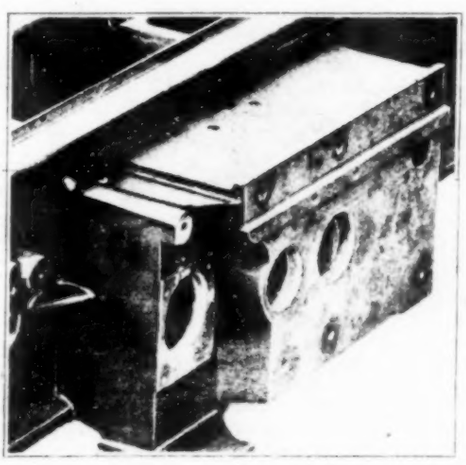


FIG. 5. "CLOSE-UP" OF HOUSING PAD SHOWING INTEGRAL KEY

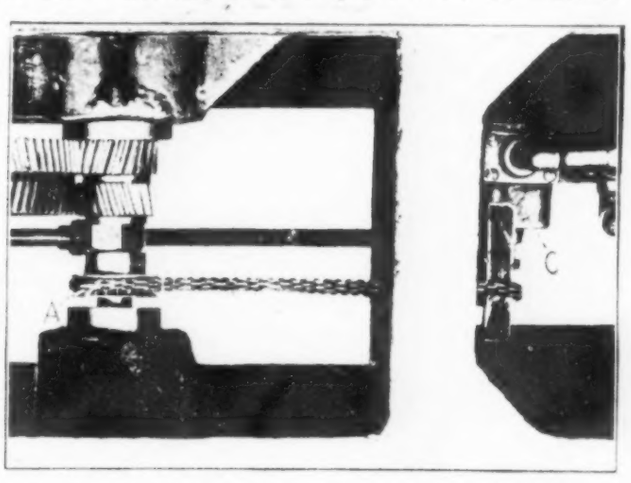


FIG. 7. SHOWING THE FORCED LUBRICATION DRIVE AND PUMP

of chips but also safeguard the operator against accident through catching an arm or leg between the planing-machine table and the usual open-bed crossties. At *C* in Fig. 4 is shown the unusual appearance caused by the absence of oil roller pockets.

Another feature that may be mentioned in connection with this design of bed is the housing pad, one of which is shown in Fig. 5. A key is made an integral part of the bed casting so that once properly machined there is no chance of key slippage throwing out the alignment of a housing.

The advantages of herringbone gears have been recognized in the incorporation of double helical gears in the first reduction of the table drive. These provide a very smooth motion to the table and are shown in Fig. 6 at *A* and *B*, as contrasted with the pervious design of all spur gears. At *C* in the lower part of Fig. 6 may also be seen the origin of the force-feed oil-pump drive in a chain sprocket on the first pinion shaft. This oil-pump drive and the oil pump itself is more clearly shown in Fig. 7 in which *A* is the driving sprocket, the chain and *C* the oil pump.

Several features of interest which are incorporated in the new design are shown in Fig. 8. At *A*, for example, is shown the method of supporting the shifter-arm whereby the weight of this arm and the resultant strain from this weight are removed from the pivot. At *B* is shown the cam-box cover with the oiling stations for oiling cams and rollers, while at *C* is shown

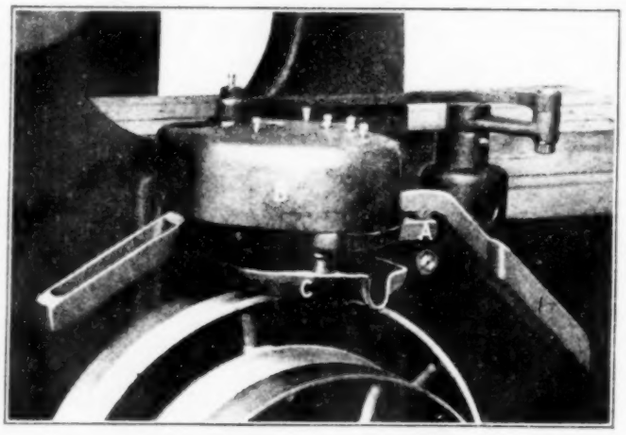


FIG. 8. BELT SHIFTER CAM UNIT EMBODIES NEW FEATURES

A, support for shifter-arm; *B*, cam box cover with roller oiling stations; *C*, drip pan to keep belts free from oil.

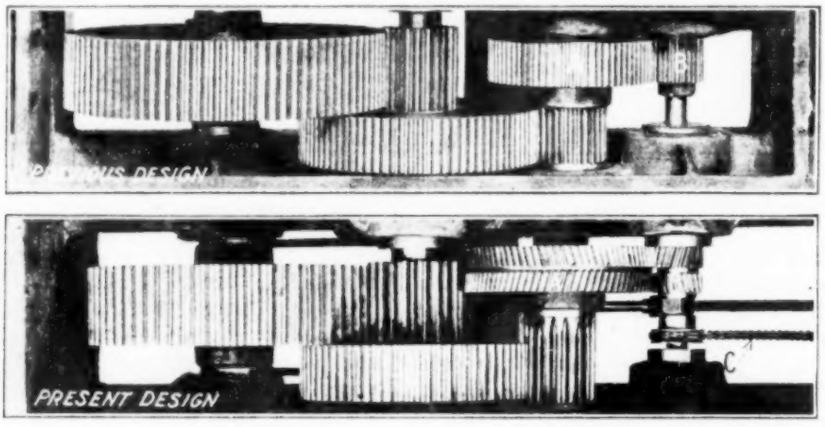


FIG. 6. FIRST PAIR OF DRIVING GEARS HAVE BEEN CHANGED FROM SPUR TO HERRINGBONE. *C* SHOWS ORIGIN OF FORCED-LUBRICATION DRIVE

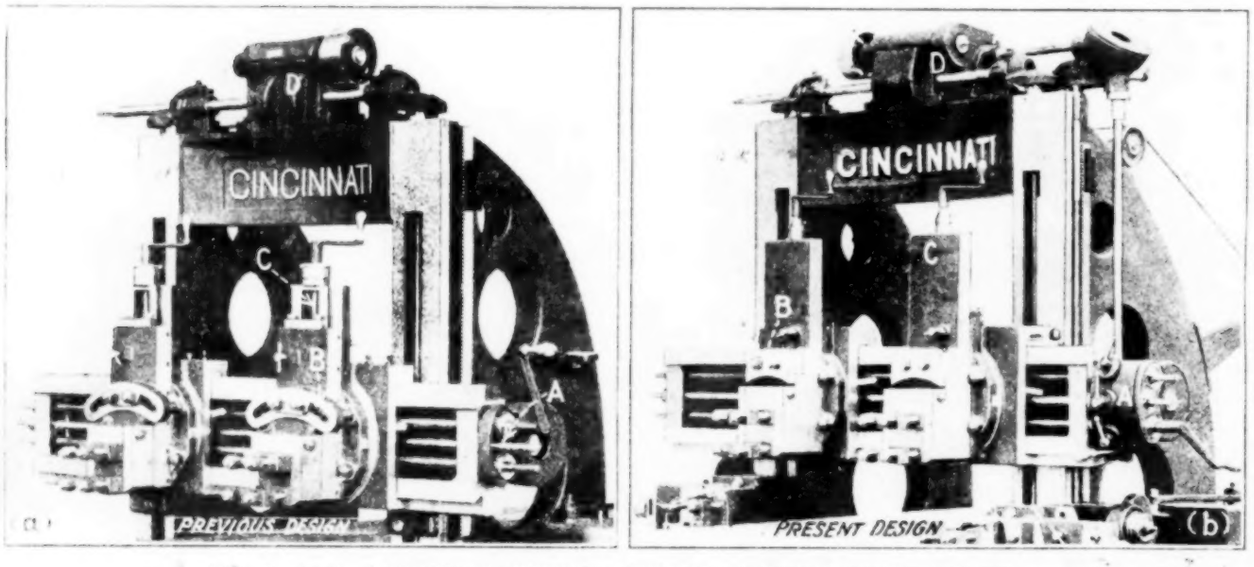


FIG. 9. RAIL AND HEADS PRESENT DEVIATIONS FROM FORMER DESIGN

A, power quick traverse is added to hand traverse; *B*, swivel-head clamp overhang abolished; *C*, tool slide fully inclosed; *D*, quick-traverse drive takes power from elevating gear pulley.

the drip pan mounted underneath the cams for the purpose of receiving drops of oil and keeping the driving belts clean.

Just why the heads of a boring mill should be entitled to rapid-traverse mechanism and the heads of a planing machine be obliged to be content with hand power for rapid traverse, is hard to imagine. This usual condition of affairs is done away with in the new Cincinnati planing machines in which rapid power traverse is applied as a regular feature. On all sizes from 30 in. to 72 in. standard, the rail heads are provided with this feature, while on all larger sizes it is provided on all four heads.

Fig. 9 shows this rapid power traverse mechanism, at *A*. It is foolproof throughout since feed and rapid traverse cannot be engaged simultaneously, and a safety arrangement is provided against breakage, should the heads accidentally come together. This is a complete innovation in planing-machine design which eliminates the cumbersome hand operations, thus saving time and human energy.

Aluminum driving pulleys, self-oiling bronze bushings and the Cincinnati two-speed drive are continued as features in this new design.

Pipe Dreams of a Tramp Machinist Fixing the Waterwheel Gate

BY GLENN GUHARITY

Will somebody please tell me why nature is so darned contrary?

The Brookdell Co. had two waterwheels and a steam engine to furnish power for the shop. In the summer there was not any too much water and the wheels sometimes lay down on their job, leaving the faithful old engine to carry the load alone. Indeed, there were times when the water played out entirely and the wheels became windmills, dragging on the engine until six o'clock came when we could disconnect them.

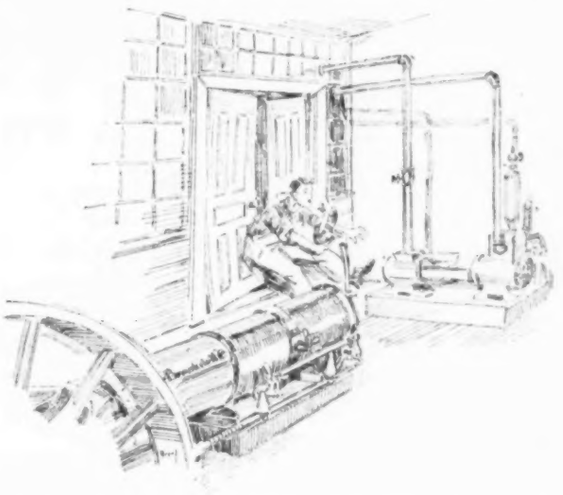
Nowadays, when they want to disconnect the waterwheels the engineer sends a boy to pull the clutches. The boy proceeds to a part of the shop directly over the wheel-pits and proceeds leisurely to "unscrew" a large polished handwheel, whistling merrily the while such tunes as "Yankee Doodle" or "The Little Birch Canoe," but 30 years ago large friction clutches were not plentiful in small town shops and as the power from the wheels was delivered through a 30-in. three-ply belt,—rather too husky to run off with a stick—when *we* had to disconnect those same wheels a man and two boys crawled through a cellar window *into* the wheel-pits accompanied by two 4-ft. monkey wrenches (key wrenches), sundry sledges, hammers and other tools, and proceeded to jack down the big bevel gears until they were out of mesh. The tunes that we whistled and the things that we said were never mentioned in the same tone of voice at prayer-meetings.

It was hot and stuffy in there in spite of the dampness, for this ceremony generally occurred during July or August and we were not down in the cool depths of the pits but on a staging just below ground level. However, there were exceptions to the rule and it was one of these exceptions that inspired my opening sentence.

In the winter the waterwheels were very, very busy, and the engine, though never out of service, had an easy time.

Scattered throughout the spacious shop yard were several acres of steam dry-houses for curing the lumber which the company used in large quantities in their product; and the perversity of inanimate nature was amply demonstrated by the fact that if anything "busted" about the dry-houses, it always happened in the summer time, while if anything necessitated our going to the bottom of the penstock and crawling (through a foot of water) into the wheel tubs, *that* invariably occurred during the period of lowest temperature of the winter.

At noon upon one cold February day, the engineer



closed the throttle of his engine and went to the wheel-gate in the corner of the engine room to stop the power. The machinery usually slowed to about half speed when steam was shut off but the wheels would carry it indefinitely at that speed, though they would not always start it from standstill.

On this day the gate would not close. The engineer put a monkey wrench on the rim of the gate wheel; still nothing doing. The engineer braced both feet against a brick wall and came back on the wrench with a surge. Something happened; he went through a glass door into the boiler room. The machinery kept on moving.

The wheels were vertical turbines located in a big closed tub at the bottom of a 30-ft penstock and the gates were in the form of a circular shutter of cast-iron fitted to the iron casing of the wheels, and, of course, inside the tub under a 30-ft. head of water. Shafting and bevel gears connected them with the gate wheel in the engine room. We afterward took those gates out—in baskets.

When the engineer recovered from his surprise at finding himself in the boiler room when he thought he was in the engine room, he consulted with Tom Jones, the master mechanic. Tom consulted with me and we all consulted with Mr. Williams, the superintendent. By the time we had finished consulting it was 10 minutes to 1 and we decided to let the power run at half-speed all the noon-hour.

At six o'clock, Tom and I were in the wheel-pit beside the big flywheel, armed with a 4 x 4 timber and some blocking. By a deft manipulation of the valves

of the engine—a Wheelock—the engineer managed to oppose the power of steam to that of water with the result that Tom and I got a chance to get the timber between the spokes of the wheel and get out of the way before a spoke settled down against the wood with a dull sickening thud.

It took two men and a boy to stop and start the machinery for the next week—it wasn't stopped at noon time. It wasn't so dangerous as it sounds, however, for once the engineer had caught and stopped the piston mid-stroke he could hold things indefinitely, for though the engine could have held a dozen waterwheels it couldn't *back* even these two over the center.

That week was a period of activity for the pattern-maker (who was also the millwright) and the cub (who was also me).

Nobody knew just what had happened inside the wheel tub and nobody was anxious to go in and find out so we decided to put an auxiliary gate in the penstock.

The penstock was a round, vertical tube of wood, over 30 ft. long or high or deep, according to which way you looked at it, and about 8 ft. in diameter. Its top end extended a couple of inches through the floor of the flume and the bottom stood on bedrock below tailwater level.

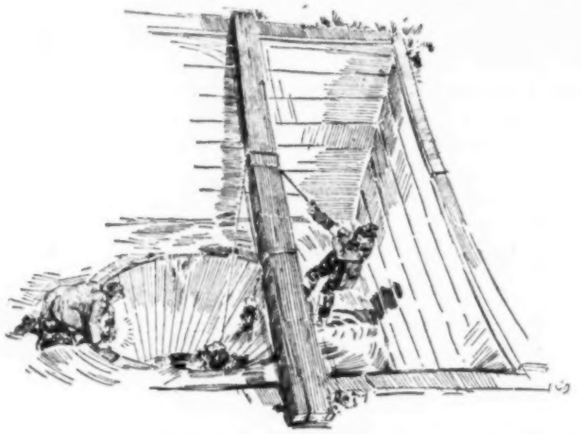
Down at the bottom of the wheel-pit and alongside the penstock stood the wheel tub, also a round wooden structure perhaps 10 ft. in diameter by 5 or 6 ft. high and connected to the penstock by a short rectangular passage measuring about 3 x 4 ft. The outlet from the tub was through two round holes in the bottom, and over each of these holes was bolted a 40-hp. turbine waterwheel whose shaft, extending through a stuffing-box in the top of the tub, terminated somewhere near ground level in a large cast-iron bevel pinion which meshed into one of the bevel gears on the shaft that ran under the floor of the power house. The flume, above mentioned, was a rectangular wooden trough 6 ft. deep and 10 ft. across. One end abutted against the mason work which terminated the "head-race" and the other end was closed by a bulkhead. It was, in fact, the artificial extension of the race; carrying the water under the shop and over the penstock, which latter was a black, ominous looking well when the water was off but of course, out of sight under ordinary circumstances.

For the temporary gate, the millwright made a frame work to fit over the rectangular opening in the penstock, building out the back to a semi-circular form to fit the curve of the interior. Bearings were made at the center of the top and bottom timbers of this frame to take a shaft, and to the shaft a plate of iron was bolted to form a "butterfly" gate—that is, a gate or valve, one-half of which would swing inward with the flow of water while the other half swung outward against it, thus balancing the pressure and making a gate that would open easily and have no tendency to slam either open or shut.

This work was all done in the machine room except for the few minutes we were obliged to go down into the pits to measure the diameter of the penstock outside and the dimensions of the throat so we could, by guessing at the thickness of the wood, arrive at approximate sizes to work to.

The night following the day the gate was finished, the mercury went out of sight in the thermometer, but four heroic souls went under the shop at six o'clock, while the engineer went up to the pond and kicked the pawls off the head gates. Shutting the gates was boy's play; opening them again was a two-man job.

The water soon ran out of the flume, accelerated in some degree by raising a small trap door in the bottom, but the head gates leaked and in spite of the trap

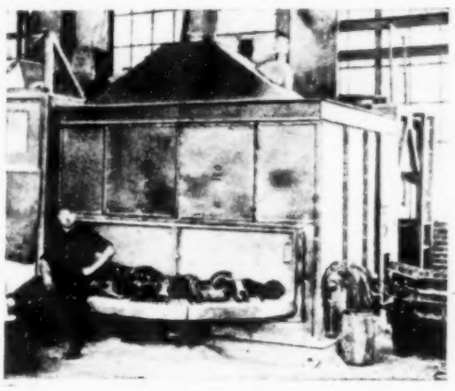


door there were 2 in. of the coldest kind of water in the flume, occasionally overflowing the raised edge of the penstock and sending a sheet of liquid ice down upon the gang who worked below.

There was 2 ft. of water in the bottom of the penstock (its end being below tailwater level) and the gang wore hip boots, rubber coats and sou'westers. We had all the lanterns we could muster (electric lights hadn't then arrived), but it was the coldest, darkest, and wettest job I ever experienced. In July we wouldn't have minded it a bit, but in July we had to tear some miles of defective piping out of a steam dry-house from which the steam must not be turned off.

However, we survived the ordeal. By four o'clock the last bolt was socked up, the last set-screw tightened, the new gate shaft connected, and by six the head gates were up and the water on the wheels. At a quarter to seven the cub proudly opened the new gate for the first time and with a little push from the engine, away went the machinery as merrily as ever. The new gate worked so satisfactorily that so far as my experience goes, no attempt was ever made to replace the old ones. The cub went home to breakfast, came back in an hour or so and because the boss was a good fellow, spent the rest of the day nodding over a planing job that was almost as big as the bed of the machine.

Did we get double time for that night? Not so you would notice it; that was 30 years ago, before machinists ate their breakfast in bed and rode to work in a limousine.



Application of Sandblast to General Foundry Work—I

By H. D. Gates

Since its introduction in 1871, sandblasing, an American invention, has seen steady development. The peculiar adaptability of the sandblast has been recognized in many fields including frosting of glass and metals, ornamentation, engraving and trimming surfaces preparatory to applying various finishes. With the development of mechanical means for handling all sizes of castings, its general adoption by foundries is not far distant. This article, which is the first of a series of two articles on the subject, deals with equipment suitable for the average jobbing foundry.

PROBABLY no other single operation in foundry practice has shown more advancement in the past decade than the cleaning of castings. Not so long ago brushing, tumbling and rubbing were the only means generally used. Although a few foundries had adopted the sandblast, up to 10 years ago it was mainly a machine set out in the open or in some isolated place and the conditions surrounding its use made it a detestable device, although its efficiency even under these adverse conditions was readily recognized.

Not to be denied the economy and advantages of the sandblast, other progressive foundries had figured that the investment necessary to provide suitable working conditions gave as large or larger return than any other foundry equipment of equal cost until, today, no foundry is considered completely equipped to economically turn out satisfactory castings without a sandblast installation that is adapted to their particular work and conditions.

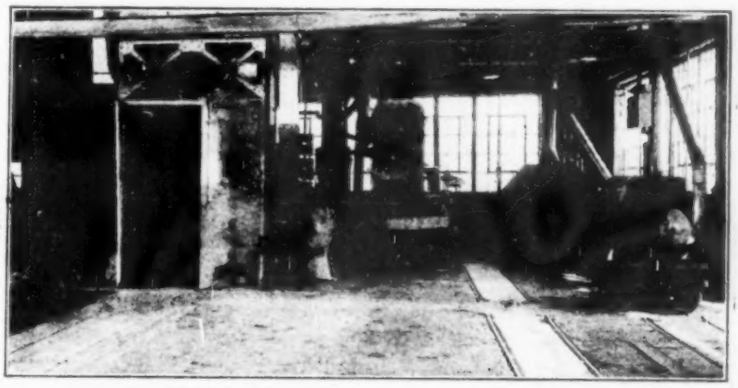


FIG. 1. TYPICAL INSTALLATION OF SANDBLAST EQUIPMENT FOR A JOBBING FOUNDRY

Where the daily output is of a varied character and the tonnage sufficient to warrant, the greatest economy will be found in the selection of a separate unit for each class of work that it will handle with greatest rapidity at lowest labor cost, the whole laid out and installed to adapt itself to the routing and handling system of the plant, as shown in Fig. 1.

For the average jobbing foundry, however, where the work runs promiscuously from small to large and the daily output is not large enough to permit of such specialized equipment, there is no type of machine that so effectually accommodates itself to all kinds of work as the high-pressure hose sandblast. When this installation is rightly installed in a properly designed room, working conditions are obtained that greatly reduce the occupational hazard, and it provides a most valuable and profitable cleaning equipment.

The hose type machine was the first method of application of sandblasting, and consists of a sealed container into which the sand or other abrasive is loaded. By direct air pressure the sand is driven through a hose of required length, the air and abrasive being discharged, in combination, through the opening of a small nozzle. Compressed air at the hose line pressure is introduced into the top of the sand chamber, equalizing the pressure so that the abrasive is fed by gravity through a small adjustable valve opening into a mixing chamber at the bottom of the container, where it is combined with and picked up by the air flow. As no expansion of the air takes place before discharge at the nozzle, the greatest velocity of the abrasive is obtained by this method, with corresponding effectiveness of abrasing action.

The first machines offered were of the low-pressure type, using from 15 to 30 lb. pressure, with large hose and nozzle and depending on volume of sand at low velocity for the cleaning action. This meant that the standard shop pressure of approximately 80 lb. either had to be reduced or a separate low-pressure compressor provided. This double compressor installation involved not only increased investment but the additional cost of piping and installation, and added care and attention. Initially compressing the air to the higher pressure at the greater power cost and reducing to the lower pressure was a waste of energy with consequent expense. As it developed later, the decreased blasting efficiency, to say nothing of the dust created by the greater volume of sand flowing, was detrimental to both the operator and the plant.

As a result there was developed between 10 and 15 years ago the modern high-pressure sandblast, Fig. 2, which is now recognized as the standard for general foundry use.

The velocity of the abrasive after leaving the nozzle increases very rapidly as the air pressure is increased, with correspondingly greater blasting effectiveness. This permitted the use of a small, easier handled hose and nozzle *A* and *B*, Fig. 3, in place of the large.

cumbersome hose and nozzle *C*, with a very decided saving in labor to the tonnage cleaned. Better operating conditions were obtained also through reduction of dust created by disintegration from the lesser volume of sand used. Some better understanding of this will be possible from the results of tests made. These show that the amount of sand blown at 30 lb. pressure to remove 1 lb. of metal from an iron bar was 3361 lb. while at 70 lb. pressure the required sand was but 2043 lb. or over 50 per cent. more at the *lower* pressure, the same size nozzles being used in both instances. Of the re-usable sand there is only 17.2 per cent. difference in favor of the lower pressure.

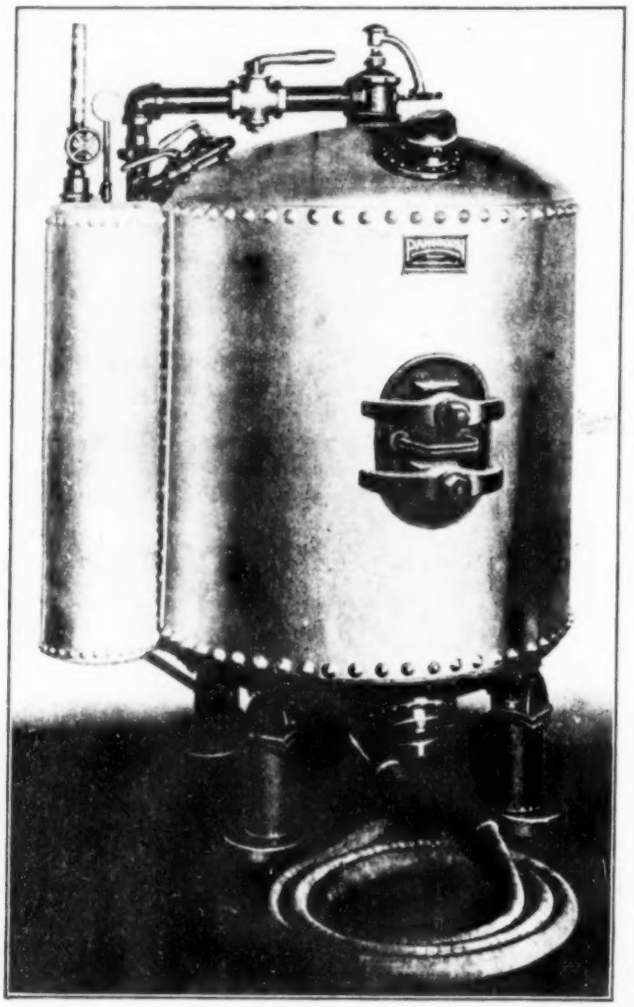


FIG. 2. HIGH-PRESSURE SANDBLAST EQUIPMENT FOR GENERAL FOUNDRY USE

The amount of metal removed per 100 cu.ft. free air per minute flowing was, at 30 lb. pressure, 0.1969 cu.in. and at 70 lb., 0.4473 cu.in., or nearly two and one-half times as much accomplished with the higher pressure with no increase in time and labor.

The amount of air consumed in sandblast operations is governed entirely by the size of the nozzle opening and the pressure maintained; this feature is therefore one that should have the most careful consideration.

Constant wear, varying with pressure and abrasive, takes place in the opening of the nozzle and this gradual enlargement means considerable increase in the consumption of air and power, as an examination of the accompanying table will show.

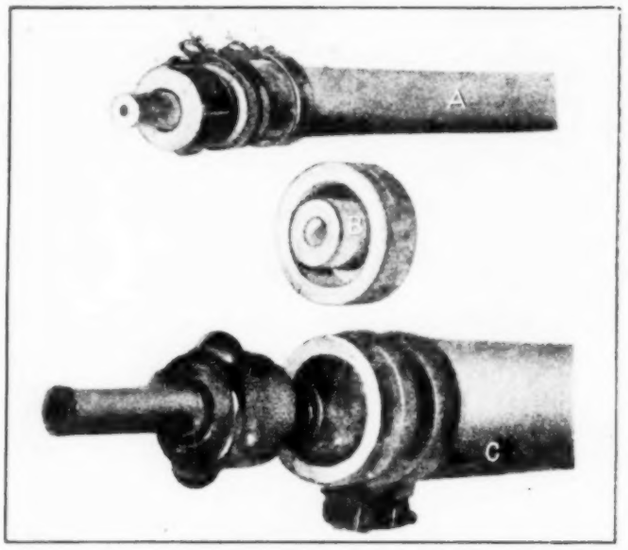


FIG. 3. HIGH- AND LOW-PRESSURE NOZZLES AND HOSE

It is obvious therefore that if wear can be eliminated considerable power expense will be saved and a constant pressure will be maintained.

While it must be admitted as a general proposition that the larger the nozzle opening the greater the area of work cleaned, still in the average plant it is often desired to pre-determine the air consumption. In many instances where the air volume is limited, any increased consumption means a drop in pressure not only at the sandblast but throughout the entire system, often to the detriment of other air tools.

COMPARISON OF THE DIAMETER OF NOZZLE OPENING WITH THE AMOUNT OF AIR AND POWER CONSUMED

Diameter of Nozzle Opening	Cu.Ft. of Air Per Min.	Air Pressure lb. Per Sq.In.	Horsepower Required
$\frac{1}{4}$ in.	76.0	70	12.7
$\frac{5}{16}$ in.	85.5	70	14.3
$\frac{3}{8}$ in.	118.0	70	19.9
$\frac{1}{2}$ in.	171.0	70	28.6

The hose type sandblast must of course be operated in dust-tight inclosure. While a room of this character is possible of home construction, greatest economy will come from a substantial room designed and built to

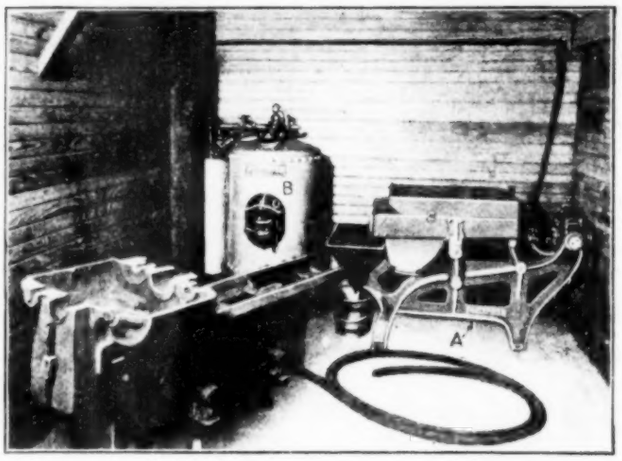


FIG. 4. AN ABRASIVE SEPARATOR AND HIGH-PRESSURE SANDBLAST EQUIPMENT INSTALLED IN A SIMPLE VENTILATED DUST-TIGHT ROOM

provide adequate ventilation and illumination, and arranged to facilitate all handling.

As the abrasive will be used over and over and a certain amount of dust created with each operation, not only do working conditions, but the efficiency of the abrasive itself, demand a thorough cleaning before each re-use to secure the greatest output with corresponding economy. For the simple rooms where the sandblast is set inside the room, an abrasive separator *A*, Fig. 4, with a powerful air motor, and equipped with double screens to make three separations in an operation, is provided. The spent abrasive is shoveled into the machine, and the fine material that has no abrasive value and the coarse material that would clog and stop the nozzle are separated from the cleaned, sharp abrasive which is delivered to a hopper for reloading the sandblast machine *B*. Mechanical handling of the abrasive assures continuous operation of the sandblast with correspondingly increased output and lower cleaning cost per ton.

The modern sandblast room is constructed of sheet steel, dust-tight and with fresh-air inlets around the sides near the base. The dust-laden air is carried off through a hood in the ceiling of the room by a powerful exhaust fan.

The volume of dust created will be governed by the character of work cleaned; that is, whether plain surfaces to which little sand adheres, or intricate shaped pieces from which the cores must be blasted; also whether sand or metal abrasive is used, and if sand, its friability.

The air should be changed in the room from five to ten times a minute, according to the character of the work. The natural tendency of the dust is to rise and this is aided by the intake of the air at the base of the room and the mechanical exhaust in the ceiling.

Electric-light fixtures equipped with white enameled reflectors, and covered with discoloid fronts to protect the lamps from flying abrasive are set into the ceiling of the room. Ventilation and free observation of the work being so essential to quantity production these features should not be slighted.

Room Equipment

The room can be equipped according to the demands of the plant. Large, heavy castings should be loaded at the molding floor on to grated top cars, the track extending into the sandblast room and the pieces cleaned on the car without unloading. If the plant is equipped with a monorail this too can be extended into the room and the pieces cleaned without handling while hanging. For small work a grated top bench can be provided where convenient. Very small pieces can be economically cleaned on the gates, thereby giving, without extra time and cost, clean scrap which is particularly advantageous and even necessary in the use of some types of electric furnaces.

It is important that provision be made for the protection of the operator, as the dust-laden air will be present in spite of the powerful exhaust fans. Various types of hoods and helmets have been devised, of which the ventilated dust-proof type, shown in Fig. 5, is most effective. The helmet fits closely to the head and is tied tightly around the neck, fresh air being introduced constantly by means of a small, flexible rubber hose *A* connected to the compressed air line. This hose is arranged so as to permit freedom of movement by the operator. Through a series of minute openings *B* in the adjustable sweat band, at the front of the helmet, a constant jet of air is passing before the operator's nose and mouth which not only provides ample air for breathing but prevents the screen glass from becoming fogged or misty.

One of the more modern adjuncts to rooms of this nature is the rotative table mounted on dust-proof ball bearings which is built into, but entirely independent of the room structure. One-half of the table forms a grated bench on the inside of the room while the other half is exposed for the removal of the cleaned

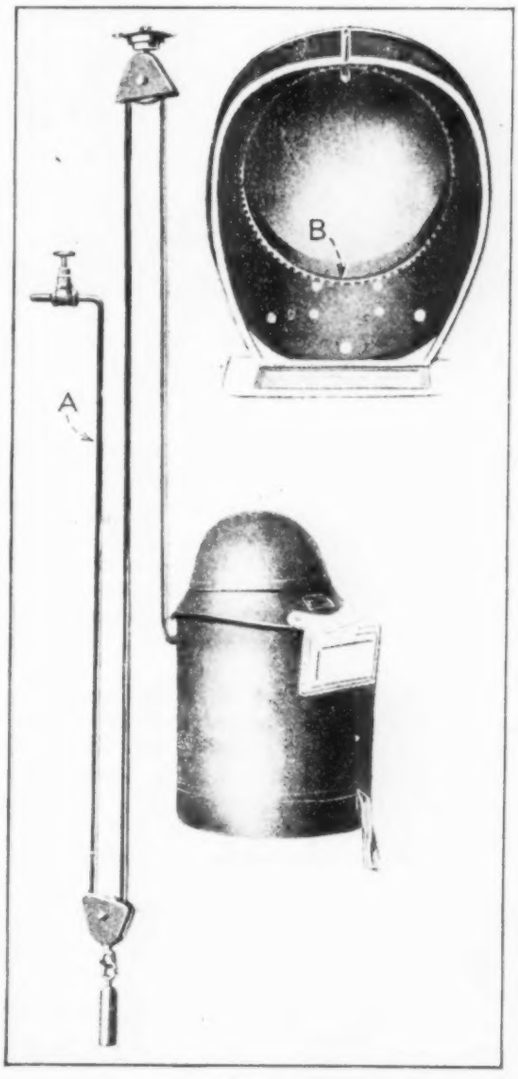


FIG. 5. DUST-PROOF HELMET

work and the loading of new work to be cleaned. A partition through the center of the table entirely closes the aperture in the wall structure when the table is in position for sandblasting.

As all operations other than the actual blasting are lightened by mechanical means, the output is increased without added labor cost and in plants with large tonnage this becomes absolutely necessary from a cost standpoint. To this end inclosures having a solid floor are provided with a chute, leading to an elevator boot, into which the spent abrasive is swept or shoveled. The elevator then carries this material to a combined mechanical and exhaust screen separator that delivers

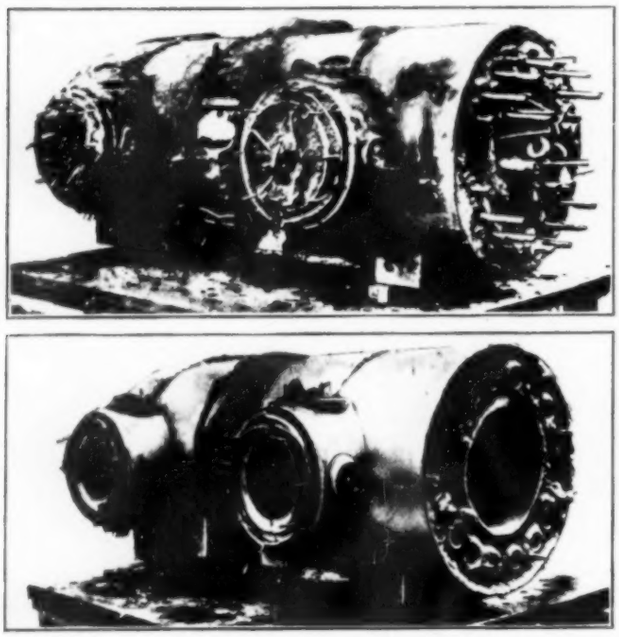


FIG. 6. THE UPPER PICTURE SHOWS A FIVE-TON CASTING BEFORE CLEANING. THE LOWER SHOWS THE SAME CASTING CLEANED COMPLETE, WITH A HIGH-PRESSURE SANDBLAST, IN ONE HOUR

the clean, sharp abrasive for re-use to a sand storage bin. The fine dust and refuse is deposited in a refuse bin with outlet at a convenient point. In installations of this kind the sandblast is usually placed outside, leaving the room entirely free for operating purposes. Controls for the operation of the sandblast, the elevation and reloading of the abrasive, are centered to a single control board within convenient reach of the operator.

A step further in the direction of mechanical handling of the abrasive provides a grated floor in the room through which the spent abrasive falls to the hopper of a conveyor which delivers it to an elevator. Rooms of this type are usually made complete with a hopper of concrete and provision made for an auxiliary sand-storage bin, loaded from the outside with several days' supply of abrasive, which is fed to the system through a sand gate as required.

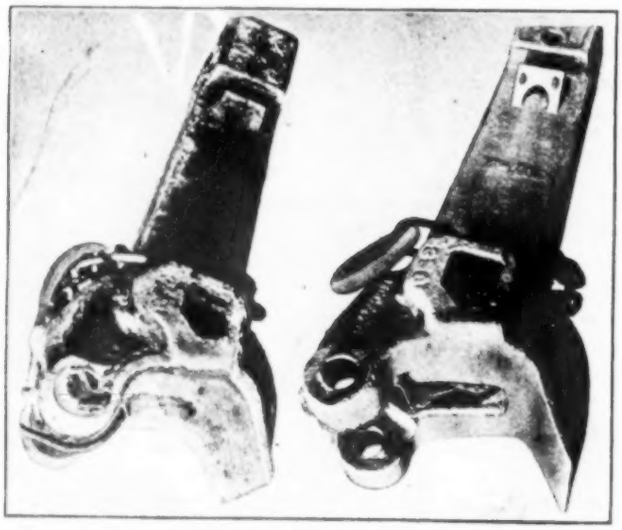


FIG. 7. CAR COUPLERS ARE CLEANED WITH STEEL SHOT ON AN AVERAGE OF 1.46 MINUTES EACH, INCLUDING HANDLING

The design, size and arrangement of these rooms are without limit. Some idea of their adequacy and economy may be gathered from Fig. 6. The large gas-engine-cylinder casting weighs approximately five tons and required the labor of two men each 15 hours, or a total of 30 hours, for cleaning by hand. It was cleaned and cores removed with a modern high-pressure sandblast by one man in one hour.

Another striking example of the efficiency of the sandblast in quantity production is shown in the case of the steel car couplers shown in Fig. 7. By using sand as an abrasive, 164 couplers were cleaned in 3 hours and 59 min. including handling or an average of 1.46 min. each. The average actual blasting time was 0.875 min. One hundred and eighty-two were cleaned with steel shot in 4 hours and 8 min. of elapsed time, including handling, or an average of 1.37 min. each. The average actual time of cleaning was, in the cases, 0.69 minute.

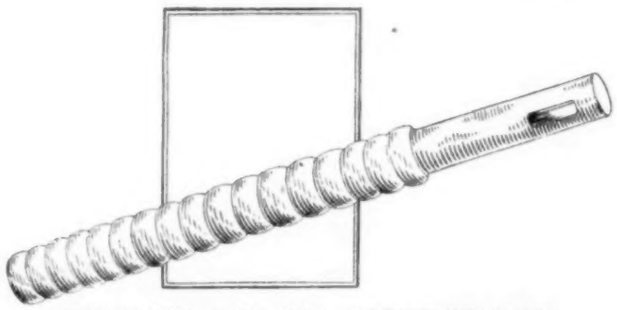
It is obvious, therefore, that in order to obtain the best results that the matter of the kind of abrasive as well as the type of equipment should receive serious consideration.

Finishing Babbitt Bearings by Burnishing

BY S. B. ROYAL

Here is a method of producing a hard close-grained wearing surface in babbitt bearings and at the same time bringing them to exact size. A tool as shown in the sketch is used which has no cutting action and does not remove any metal, as the "teeth" are rounded and finished smooth. The finer this finish the better will be the bearing.

The first three teeth are slightly smaller than the hole at the start and the last three are exactly the size that the finished hole is required to be. The intermediate

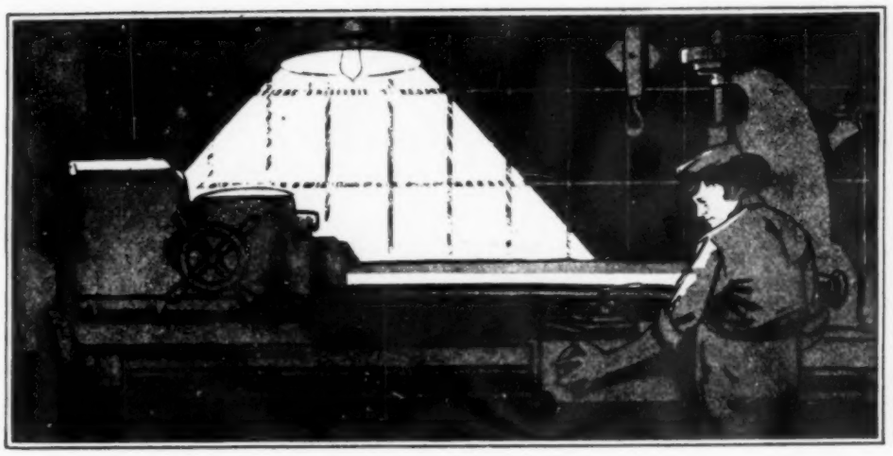


BURNISHING TOOL FOR BABBITT BEARINGS

teeth range in size between these two extremes, each tooth being an amount larger than the preceding one equal to the difference between the diameters of the teeth at either end divided by the number of intermediate teeth.

The surplus metal instead of being cut out is compressed. This produces an exceptionally good bearing surface that will outwear one made by the ordinary method of scraping, which leaves the surface soft and porous.

The method may also be used on soft-brass bearings and bushings but in this case only about 0.008 in. of metal should be left.



LIGHT, ELECTRICITY and The Shop

By C. E. Clewell

Lighting Fixtures for Shop Illuminatiom

This article points out some of the equipment now on the market for accommodating the new lamps treated in a previous installment. New designs of fixtures are described, emphasizing their features for minimizing the glare of Mazda gas-filled lamps. Examples of the application of some new auxiliaries are shown by photographs, one of which illustrates the tendency to conceal the lamp filament from the eyes.

THE introduction of the Mazda C tungsten lamp within the past few years has brought about a new condition which requires the most careful attention to prevent its otherwise great advantages being offset by corresponding disadvantages due to its great brilliancy, excessive glare and harmful results to the eyes. One of the hindrances to the proper care regarding these points in the average shop is that the new Mazda C lamp is suitable for use in the ordinary socket[1] and hence it is not uncommon to find a large and brilliant Mazda C lamp in a socket which formerly contained an ordinary carbon-filament lamp, with no provision made for protecting the eyes from the brilliant filament of the new lamp.

The Mazda C unit has been adopted very generally, and hence its proper use, as taken up in the following notes, may be looked upon to apply to a part of the present practice in shop illumination.

Brilliancy of the New Lamps

The feeling which anyone experiences in looking at one of these new lamps is that they are very bright and that a great deal of eye discomfort results if they are not properly protected by globes or reflectors for concealing the filament. However, the degree of this brightness is not perhaps so well appreciated. Figures show that the brightness of the sky with light clouds is in the neighborhood of 2000 units, the name of this unit not being essential to this discussion. The ordinary fish-tail gas flame has a brightness of little more than 1000 units, the glass-tube mercury-vapor lamp between 6000 and 7000 units, the carbon-filament lamp about 250,000 units, the Mazda B lamp approximately 500,000 units, and the Mazda C approximately 1,500,000 units, all given in the same units as the sky brightness.

Great Importance of Protection for the Mazda C Filament

The foregoing brightness values are given purely for comparative purposes, and it will be noted that the Mazda C lamps possess a brilliancy about three times greater than the Mazda B lamps, about six times that of the old carbon-filament lamp, and on the order of 1500 times that of the old fish-tail gas burner. These are astonishing figures and it is perhaps difficult for the reader to grasp their significance. The conclusion which they force, however, is that the danger to eyesight, the tendency to increase accidents because of excessive glare and blinding effects and the possibility of permanent injury to the eye in extreme cases constitute an absolute necessity for properly shading these new lamps so that the eyes of employees are not subjected to the direct light from the unprotected filaments.

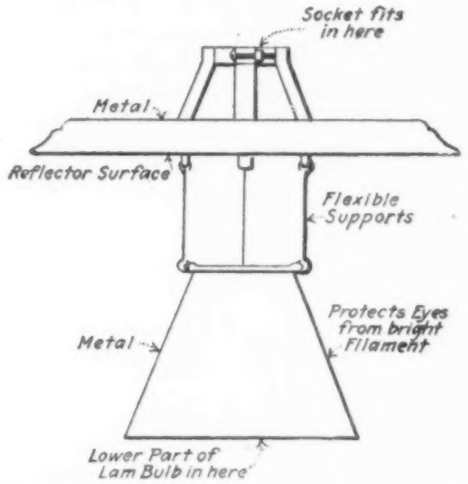


FIG. 1. DIAGRAM SHOWING GENERAL OUTLINES OF A FIXTURE DESIGNED FOR THE MAZDA C LAMP

[1]This statement applies to sizes of 200 watts and less. Lamps of larger sizes than 200 watts have a special base which requires a larger-sized socket known as the Mogul type.

The Mazda C lamp is not sold with its fixture as a complete unit as is the case with mercury vapor lamps, and this fact throws the responsibility upon the shop management in the matter of selecting and using

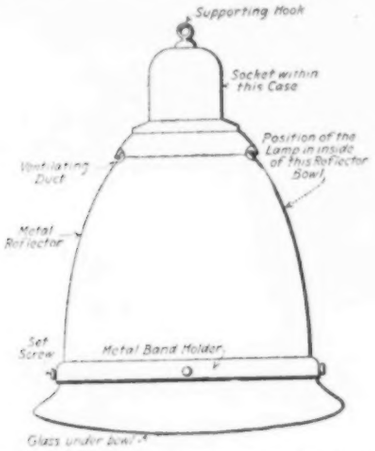


FIG. 2. SPECIAL TWO-PART FIXTURE DESIGNED TO MINIMIZE THE GLARE FROM MAZDA C LAMPS

suitable auxiliaries for them. From this standpoint it is believed that the following notes will be helpful and suggestive in a practical way.

In Fig. 1[1] an inexpensive fixture is shown for the Type C unit. The position of the lamp when in place is such as to be concealed from the eyes of employees in their ordinary working positions. The upper reflecting surface is white enamel and is intended to intercept that part of the light which passes upward from the lamp and to redirect it in a useful downward direction. The upper and lower parts of this fixture are held together by supports hooked into place so that the lower part is free to move and hangs in its normal position due to gravity. The interior surface of the lower part is also white enamel, thus acting as a reflector.

In Fig. 2 a development of the "reduced glare" idea is shown. This fixture is essentially a metal bowl-type reflector with a white interior surface and equipped with a shallow under bowl of translucent glass. The

[1]Fig. 1 refers to equipment of the Luminous Unit Co.; Fig. 2, Macbeth-Evans Glass Co.; Fig. 3, Harvey Hubbell, Inc.; Fig. 5, Bayley & Sons; Fig. 6, Phenix Glass Co.; Fig. 14, Thompson Electric Co.; Figs. 4, 10,11 and 12 are shown by courtesy of the National Lamp Works of the General Electric Co.; Figs. 8 and 13 are due to the Westinghouse Lamp Company.

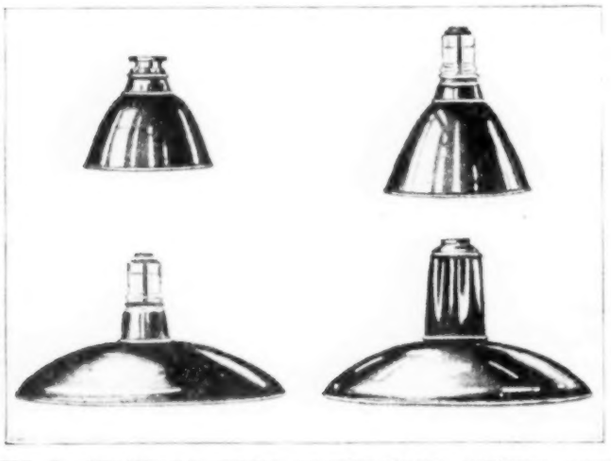


FIG. 3. STANDARD TYPES OF THE BOWL (UPPER) AND DOME (LOWER) REFLECTORS

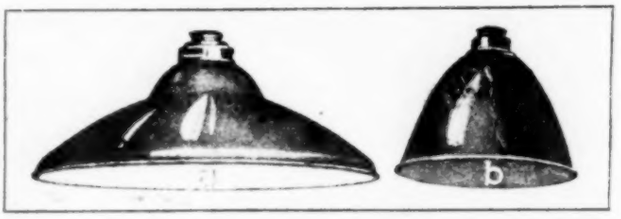


FIG. 4. PORCELAIN-ENAMELED STEEL REFLECTORS, (a) DOME TYPE, (b) BOWL TYPE

socket for the lamp is contained in the housing case at the top, and the glass under the bowl is fastened to the metal reflector by milled head screws. The provision for ventilation near the top of the reflector is an important feature in all inclosing fixtures for the Mazda C lamps because of the large amount of heat they develop.

Figs. 3 and 4 show typical modern metal reflectors for shop service. Fig. 3 illustrates the so-called bowl type (above) and the dome type (below). Fig. 4 (*a*) is a dome reflector and Fig. 4 (*b*) a bowl type. The latter two are made of porcelain-enameled steel, and are suited to shop spaces because of their efficiency, coupled with nonbreakable quality and lasting nature of the surface of the reflector.

FIG. 5. COMBINATION FIXTURE FOR REDUCING THE GLARE OF BRILLIANT LIGHT SOURCES

The two shapes shown in Fig. 4 are the common forms of industrial lines of metal reflectors. When the under part of the lamp is coated with a frosting known as "bowl-frosting" the dome type is advocated, Fig. 4 (*a*). This form of reflector is somewhat more more desirable than the "bowl" type because it affords a larger area for the reflecting surface, reduces the glare effect and produces a better quality of illumination in

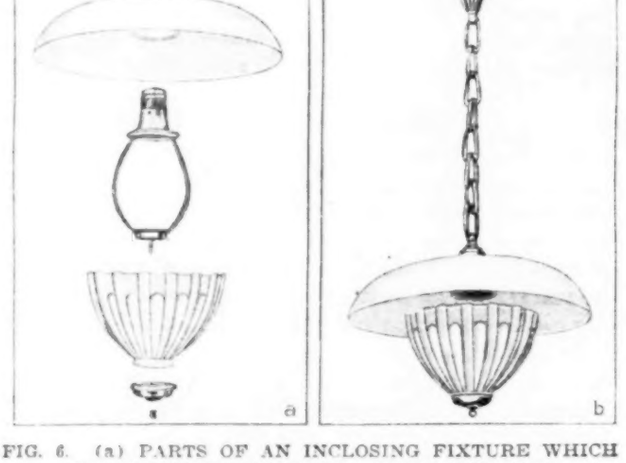


FIG. 6. (a) PARTS OF AN INCLOSING FIXTURE WHICH COMPLETELY SURROUNDS THE LAMP, (b) ASSEMBLED FIXTURE EXCEPT LAMP

the matter of softer shadows. However, in selecting the dome type it is important to have the lower rim of the reflector well below the lamp filament[2].

Semienclosing Glass Fixtures

One of the results of lamps with high brilliancy of filament has been the development of many new fixtures of the partially enclosing glass type illustrated in Figs. 5, 6 and 7. The latter two illustrations are especially worthy of attention because they indicate the simplicity of the make-up of the completed fixtures. In Fig. 6 (*a*) there is a lower glass bowl which conceals the

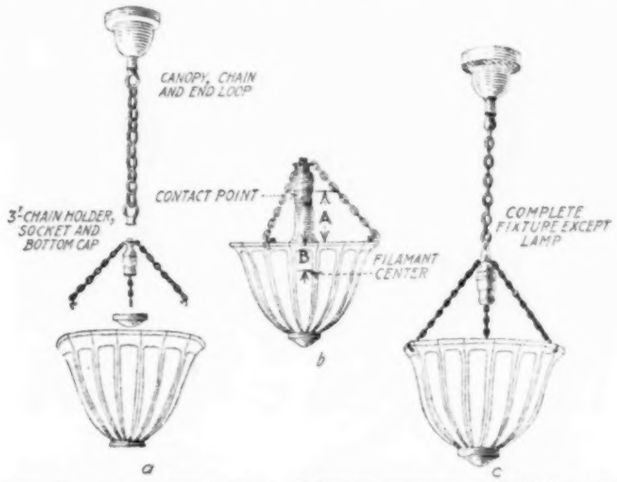


FIG. 7. (a) PARTS OF A SEMI-INDIRECT FIXTURE, (b) DIAGRAM SHOWING PROPER LOCATION OF FILAMENT IN BOWL, (c) ASSEMBLED FIXTURE WITHOUT LAMP

filament and sends the light to the upper glass reflector which redirects the light to the floor. In both of these parts some of the light is transmitted directly through the glass.

The fixture in Fig. 6 employs a different principle than in the type shown by Fig. 7, since in the former the upward light is intercepted by the upper shallow glass reflector. In Fig. 7, however, the light which passes upward is supposed to reach a light-colored ceiling above the fixture, which in turn reflects much of this light to the work beneath.

Attention is directed to (*b*), Fig. 7. The manufacturers of this fixture have taken steps to insure the proper use of the fixture by specifying the point at which the concentrated filament should be located with respect to the under glass bowl. This means that a given length of the supporting chains and a given bowl are together adapted to one particular size of lamp. An installation of reflectors, somewhat like that in Fig. 4 (*a*), is shown in Fig. 8.

Some Special Reflector Types

Fig. 9 shows an application of a prismatic-acting glass unit with two parts fused together into one finished piece. The functions of the upper and lower portions are indicated in a general way by the arrows in the diagram. The semienclosing type is known as a "reflector-refractor" unit, the upper part serving as the reflector and the lower as a refractor to the light

[2]Reference is here made to the practice of the National Lamp Works of the General Electric Co. See Bulletin 7C of Dec. 20, 1917, which the reader will find to contain much practical information on the lighting problem.

FIG. 8. SHOP-LIGHTING SYSTEM WITH TUNGSTEN LAMPS IN SHALLOW-BOWL METAL REFLECTORS

rays of the lamp. This unit is limited in its application primarily to office purposes.

Fig. 10 is a view of a new "reflecto-cap" unit, details of which are shown in Fig. 11. This unit is an im-

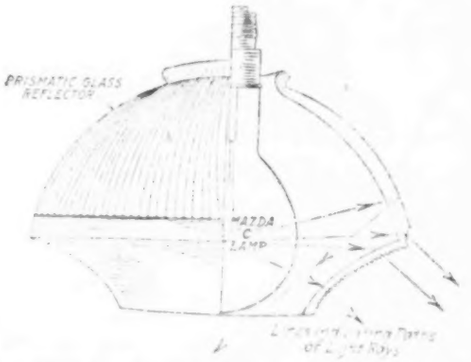


FIG. 9. SPECIAL COMPOSITE PRISMATIC REFLECTOR-REFRACTOR FOR OFFICE LIGHTING AND OTHER LOCATIONS

portant one because of the principles on which it is based and the effects obtainable.

The lower part of the lamp bulb is covered by a metal cap with a silvered inner surface so as to conceal

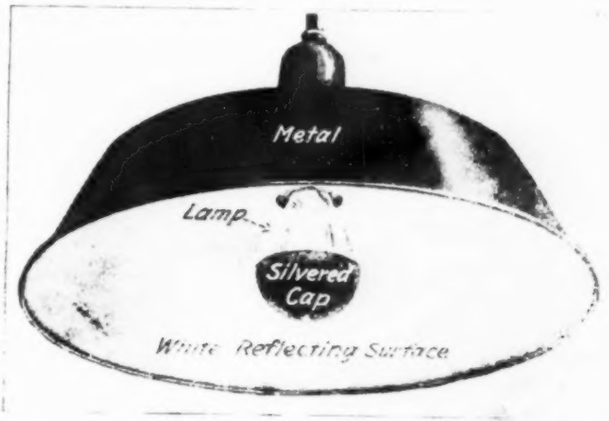


FIG. 10. REFLECTO-CAP FIXTURE ESPECIALLY DESIGNED FOR SHOP LIGHTING

completely the brilliant filament of the lamp. At the same time the inner surface of this cap, by its efficient reflecting capacity, sends a large percentage of the light, which would ordinarily go downward, up to the under surface of the reflector above from which all of the

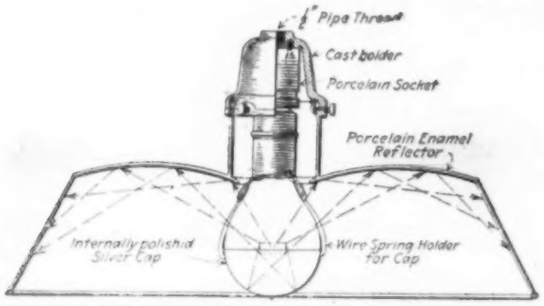


FIG. 11. DIAGRAM OF THE REFLECTO-CAP UNIT SHOWN IN FIG. 10

light that reaches the floor comes. This enlarged area of the upper reflector is intended to reduce glare and increase the eye comfort of those using the light, and also to produce softer (that is, less distinct) shadows than would be possible with a corresponding upper reflector without the under cap. The under cap is held against the lamp bulb by wire and spring supports. An illustration of units like those in Figs. 10 and 11 is shown in Fig. 12. The installation shown in Fig. 13 makes use of a reflector somewhat like that of Fig. 4 (*b*).

Supporting and Disconnecting Hangers

One of the notable developments in the Mazda C line of units has been the extension to the very large sizes, lamps of 1000 watts being the upper limit commercially at present. In the higher bays of shop aisles the tendency is to use the large sizes, and the problem of systematic maintenance may become more complicated than where the lamps are nearer the floor.

In some shops these high lamps may be reached from the crane or possibly from an adjoining mezzanine floor. In other cases it may be economical to employ some form of disconnecting hanger by which the lamp may be lowered to a point within easy reach of the floor and at the same time to disconnect it electrically from the supply circuit. A suggested use of such a hanger is shown in Fig. 14 for yard lighting, although the device is equally applicable for attachment to shop ceilings or trusses. The convenience of such a scheme is apparent for the renewal of burned-out lamps and for the systematic attention which should be given to the cleaning of lamps and reflectors.

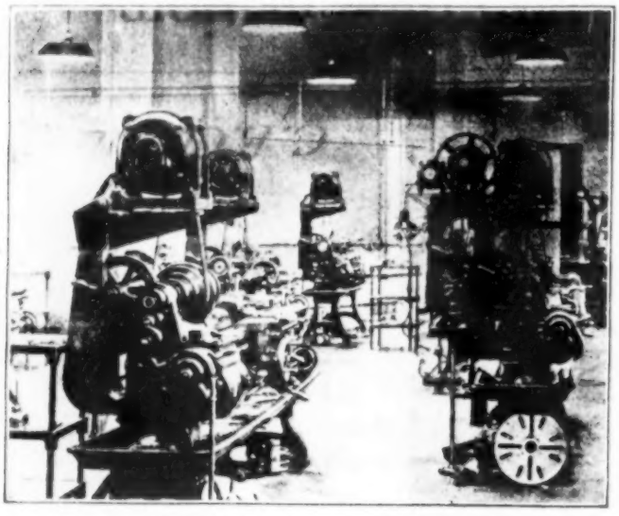


FIG. 12. AN INSTALLATION OF REFLECTO-CAP UNITS IN A SHOP

Uses of the Different Types

As previously stated the units shown in Figs. 1 and 2 have been designed expressly for shop purposes. Similarly the metal dome and bowl type reflectors of Figs. 3 and 4 may be classed as shop equipment. The

FIG. 13. INSTALLATION OF TUNGSTEN LAMPS IN METAL REFLECTORS OF THE BOWL TYPE

semienclosing fixtures of Figs. 5, 6 and 7, while perhaps suitable for certain special cases of machine-shop work, are more often used for the illumination of offices and drafting rooms. Fig. 9 applies particularly to the needs of office lighting.

The "reflecto-cap" fixture of Figs. 10 and 11, and an installation of which is shown in Fig. 12, was designed primarily for "high-grade machine shops, plate-glass works, inspection processes, and similar activities requiring high intensity," and which, therefore, require larger lamps, from which the glare might be a serious drawback if ordinary open reflectors were employed. In spaces where the foregoing classes of work are conducted, this unit "permits the use of ample illumination for the most accurate discrimination of detail without subjecting the eye to unnecessary discomfort and fatigue."

While the developments in mercury-vapor lamps have not involved such large changes in that type of lamp as has been the case with Mazda lamps of the new form, many successful installations of mercury-vapor lamps are in operation on a large scale. Both the Mazda and the mercury-vapor lamps have advantages of their own and the widespread use of both types shows that each plays an important part in the field of machine-shop illumination.

A word of caution is in place concerning the plans of new shop systems or the recasting of old systems by the substitution of new lamp types. Many shop man-

agements, in an effort to improve lighting conditions, may naturally consider that an increase in the quantity of light is all that is required. With the Mazda C lamp it is just as important to employ reflectors and suitable fixtures for the purpose of directing the light where needed as was the case with older and less efficient units. The fact that light is cheaper today than ever

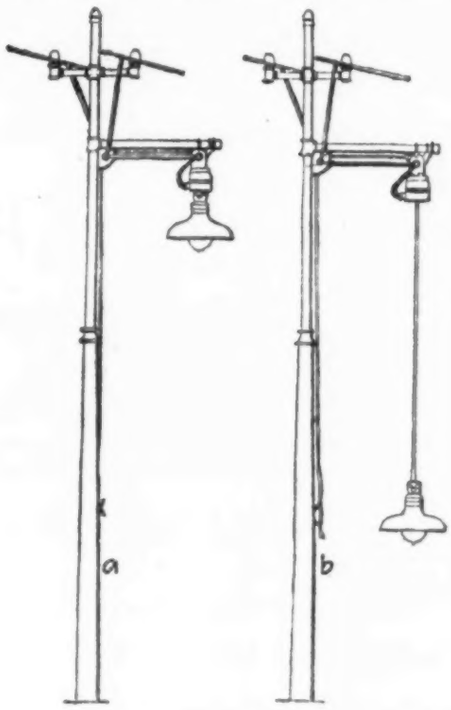


FIG. 14. A DISCONNECTING HANGER FOR YARD LIGHTING. (a) LAMP IN PLACE, (b) LAMP DOWN FOR CLEANING OR RENEWAL PURPOSES

before should not be taken as an indication that any less care is demanded in its effective utilization.

Shop-lighting systems call for greater attention to minimizing glare and blinding effect of unshaded lamps than to the matter of intensity or quantity of illumination, and there is little doubt but that of these two parts of the lighting problem the avoidance of glare is the more difficult to handle successfully.

Using Two Tools At Once

BY M. JACKER

I do not find the compound rest so admirably suited to making fine tool adjustments when step-turning or facing with a two-tool set-up described by Hugo F. Pusep on page 110 of *American Machinist*.

I will refer to the part where he says, "The swivel nuts are loosened and the compound rest turned around sufficiently so that the finishing tool just touches the shaft to be reduced, while a feeler gage corresponding in thickness to the depth of the finishing cut is being held between the shaft and the roughing tool."

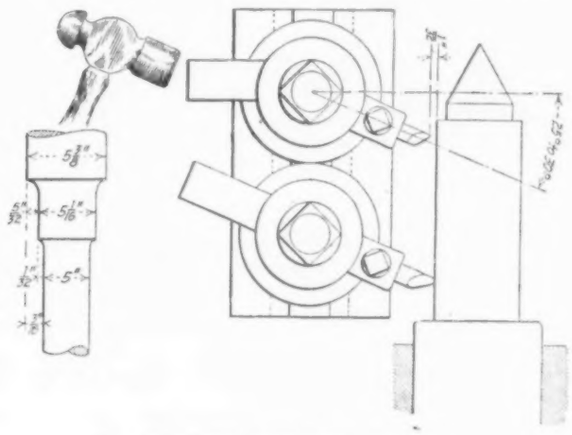
Every mechanic knows that the accomplishment of this desired setting would require the tapping of the compound rest from side to side with a piece of lead or babbitt alternately with the manipulations of the feed screw, till finally you would get close enough and say, "We will let it go at that."

I give Mr. Pusep credit for this new wrinkle, but why go through all this maneuvering when the object sought is, to produce a roughing and finishing cut at one and the same time.

There is nothing so very particular about the depth of the finishing cut—perhaps one-quarter to one-sixth the depth of the roughing cut would be found a good proportion on most work, depending on the finsh desired.

The cylindrical accuracy of work turned out with a two-tool set-up on the same slide rest depends on the cylindrical shape of the piece before the cuts are taken. Forgings more or less out of round transmit the varying pressures on the roughing tool, through the slide-rest to the finishing tool, producing a duplicate of all the undulations in the rough forging in miniature upon the finished product. This will be found less marked in a modern, well-designed lathe.

How to go about it: Assuming that a $5\frac{3}{8}$-in. diameter shaft is to be reduced to 5 in.—this means a $\frac{3}{16}$-in. cut



SETTING THE TWO TOOLS

is to be removed with two tools, allowing about $\frac{1}{32}$ in. for the finishing and $\frac{5}{32}$ in. for the roughing tools as may be seen in the sketch.

Either set your tools to the tail spindle before you put the shaft into the lathe or set them to a partly turned position on the work. Have the noses of the toolholders point anywhere from straight to preferably 20 to 30 deg. to the right for the following good reasons: The work is less liable to chatter; the toolholder set-screws are not overstrained or crushed on their points, nor the toolbits broken trying to hold them from being pushed back into the toolholder, which is the case when the tools slant toward a heavy cut.

You can maintain a good shear on the toolbit with a minimum of waste in re-grinding. The tool will never dig into the work under heavy feeds and cuts; for when for some reason the tool point carries away, the pressure becomes great enough to push the tool and holder to the right, leaving the work instead of digging into it. This often happens where this kind of toolpost is used and the average machinist prepares for it by a constant overstraining of the toolpost screw, sometimes using a piece of pipe on the wrench.

After the finishing tool has been securely fastened, screw the slide rest in so that the finishing tool just about touches the spindle or shaft; then by eye bring the roughing tools up to about $\frac{1}{32}$ in. from the spindle and fasten securely. That is all there is to it.

It's Time to Take Sides

THERE were many Northerners who believed in slave-holding and many others who were indifferent to it, but they took sides when the show-down came. They fought to preserve the union.

There are many Americans who have believed in decent trade unionism and others who have not opposed it, who will stand on the side of law and order when the show-down comes.

When Mr. Gompers introduced his "closed-shop" resolution and forced its consideration, he knew it would block the labor conference. There were a hundred other subjects on which employer and employee could get together and agree, to the benefit of the public, but Mr. Gompers threw a monkey wrench into the machinery.

The American public is waking up to the fact that most of our so-called labor leaders do not want industrial peace. Industrial peace would do away with the necessity for agitators' salaries and union dues.

If Mr. Gompers, who openly sided with the rebel police of Boston, now that he has smashed the industrial conference, throws his influence to the alien mob of steel strikers led by Syndicalist Foster, it forecasts the wreck of the A. F. of L. smashed under the crushing weight of decent public opinion.

The British 18-Pounder Quick-Firing Gun

(Concluded from page 621)

In finish-boring the muzzle end the gun is held in a chuck, the breech end running in a steadyrest at the ground bearing. The boring head is detailed in Fig. 13. A double-ended cutter, set to the bearing pads in the head, makes a forward cut. The cutter is placed at the front end of the slot in the bar with a packing piece in the slot behind it. Without withdrawing the bar, the

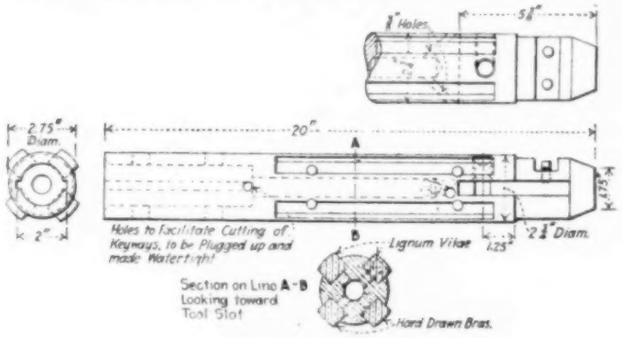

Holes
Diam.
Holes to facilitate Cutting of Keyways, to be Plugged up and made Waterright
Lignum Vitae
Diam.
Section on Line A-B Looking toward Tool Slot
Hard Drawn Brass

FIG. 13. FINISH-BORING HEAD

cutter is removed with its packing piece, and in place a floating cutter (Fig. 14) is inserted. The gap in the chuck allows the cutters to be removed and changed. For the first part of the operation the gun is run at 18 r.p.m. and the feed is $\frac{9}{32}$ in. per min. At the finish-bore the gun makes 11 r.p.m. and the feed is $\frac{1}{4}$ in. per minute.

Finish-Planing

In finish-planing (see Fig. 15) the gun is held in a cup center at the muzzle end and at the breech end in a bell chuck. In this operation the jackets are finished singly and two copy bars are used, one as usual for vertical adjustment and the other at the side for rotation. Owing to the irregular contour, the gun has to be rotated, while at the same time the tool has to be moved relative to the axis line. The cutting speed is 25 ft. per min. and two cuts are taken, once around with an ordinary planing tool finishing usually with a spring tool. First, the body is planed around as far as circular motion will permit; then the tops of the webs are planed in order to get a datum line, a gage set to the vertical center line of the gun showing the relative position of the body and top of the ribs. The radii connecting the top of the body and the webs are left. The gun is then rotated and the under side of the body is circular-planed and the thickness of the web obtained, allowing 0.005 in. for fitting. The radii are then worked out at the top and bottom, and finally the inclines at the sides are machined.

The breech rings are supplied from the outside and each is allocated to its own gun. From each ring gages are prepared by means of which the breech end is threaded so that a travel of 0.4 in. measured circumferentially is allowed for tightening during the shrinking process. The gages supplied to the turner include one for the length of bearing from the end of the web, another for the form of radius and plain part on collar, and a third to measure from the inner face of the ring to the middle thread. From the latter is set a gage for working from the same face on the gun, this gage having to enter the thread 0.4 in. from the center line, as mentioned, for pulling-up purposes. Then, in addition to the ordinary pitch gages and the gages set to the bottom of the thread diameter, a length gage measures from the end face to the end of the thread, and further there also is a radius gage for the end. The thread on the jacket is made 0.01 in. larger than the thread on the ring, for shrinkage. The thread is of a special half-buttress form, 0.02 in. being left inside the collar of the bearing for finish after the breech ring has been shrunk on.

The breech ring and gun go together in the fitting shop, and the block, also obtained from the outside, is

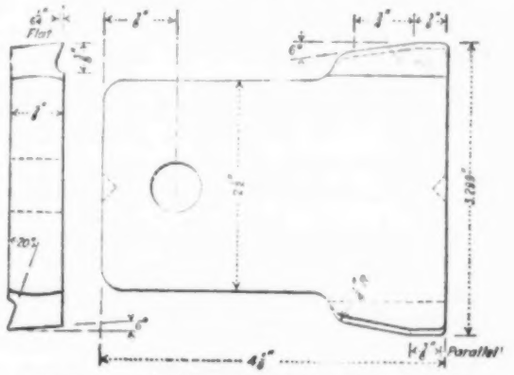


FIG. 14. FLOATING FINISHING-CUTTER

tried in the ring. If it does not go home each thread is scraped slightly, that is, not more than a few thousandths of an inch. In the case of new guns this work is very seldom necessary, though in repairs it generally has to be done.

ARMY ORDNANCE NEWS

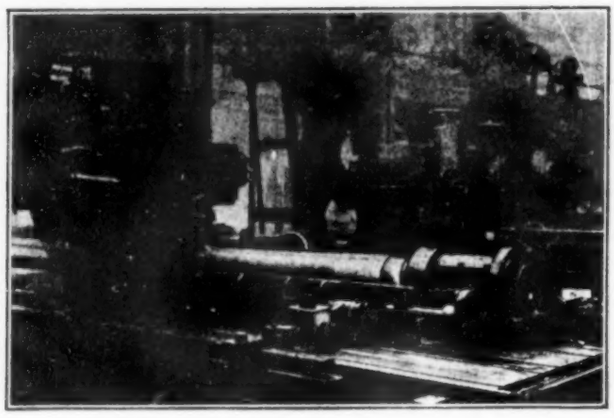


FIG. 15. FINISH-PLANING THE BODY

The gun is put in the lathe and drawn up on a cone at the muzzle end, with a steadyrest at the bearing. On the webs is placed a body gage (see Fig. 16) with the piston lug bored to take a testing spindle which, when the ring is in correct position, slides easily through holes in both lugs. The ring is raised in the furnace to a black heat, the maximum expansion permitted being 0.015 in. on the diameter. After being heated it is carried by a crane, to the gun in the lathe, and, the latter being run slowly, the ring is screwed on until it is home. In this position the testing spindle in the lug of the body gage is pushed forward into the breech-ring lug. The final position is adjusted by hammer blows on the lug. The ring is then cooled off, water being applied to the lug side first, the lug, of course, being on top. By means of the cooling water it is possible to pull the ring either way, the ring moving toward the side that is being cooled. In this way it can easily be swung $\frac{1}{16}$ in.

The chamber is bored in three main sections; powder chamber, neck and shot chambers. The first operation is to rough-out the powder chamber. This is done in two cuts by means of two flat form cutters, each cutter taking half the length and leaving about 0.020 in. for finishing, the bar being supported in the bore by a pilot-bushing. To finish the powder chamber a single-point tool is employed, the chamber being finish-bored to the tolerances. The slide is set over (see Fig. 17) to the required taper and the screw is driven from the back shaft of the lathe. A chain drive transmits the motion from the back shaft over a guide pinion to the screw.

Fitting to Cartridge Gage

For fitting to the cartridge gage 0.02 in. has been left on the breech end of the A-tube. This excess is removed in the lathe, and a dummy cylinder is placed in the breech to test roughly, leaving 0.005 in. for the final adjustment. Then an extractor fork is placed in position and a cylinder gage bearing against the end of the A-tube is employed, the face having a center plug adjustable by screw and graduated, this being set to suit the actual breech mechanism used. The end of the tube is faced up until the breech block closes on the screwed-plug face at the desired reading of the gage, which usually leaves about 0.01 in. clearance.

For truing the clinometer plane the gun is bedded on parallels under the webs, a straight-edge is set in the bore, and the clinometer reading is taken. The clinometer plane is then adjusted by scraping to give the same reading, this work being done by fitters. The straight-edge is then put across the parallels at the muzzle end and the clinometer set to this, the clinometer plane being thus tested in the cross direction, that is, across the webs. The operation in this particular factory is only preliminary, the work being finished elsewhere.

Rifling the Gun

For rifling, a Whitworth machine and rifling head are used. The muzzle of the gun being supported in a steadyrest, the breech end is secured by four screws in the dividing head of the machine, the dividing plate having 24 spaces to correspond with the number of grooves. Two tools are employed, the shape corresponding to that of the groove required. Lard oil is used as a lubricant, a very smooth cut being required. The feed is by hand and about 18 to 20 cuts are taken. The practice is always to gage from the bore to the bottom of the grooves. In no case is the rifling head allowed to be more than 0.006 in. smaller in diameter than the bore, 0.004 in. allowing sufficient clearance. Two complete turns of the feed wheel are necessary to get the full depth of rifling, and to avoid mistakes the operator usually marks on the feed head in chalk to show when one complete turn has been made. This work, however, is done by women, who, it has been found, often forget; therefore, on the feed-wheel spindle a pinion is placed, to gear with a wheel of twice the size, the rim bearing a plunger hole. One turn of this wheel means two revolutions to the feed wheel; therefore, if the plunger enters at the start it will enter the hole again at the final position of the wheel. The block carrying the plunger swings and can be fastened in any required position, according to the exact size of the bore, the plunger being set to enter the hole when the rifling tool is just touching the gun bore. After the rifling the burrs are removed by rubbing with emery cloth placed on a wood block. The gun has of course been removed from the machine and the inspectors take impressions, which are examined and gaged. The usual working limits on the rifling are 0.002 in. to 0.003 in. either way on depth and width.

Dealing with repairs, many of the operations on the

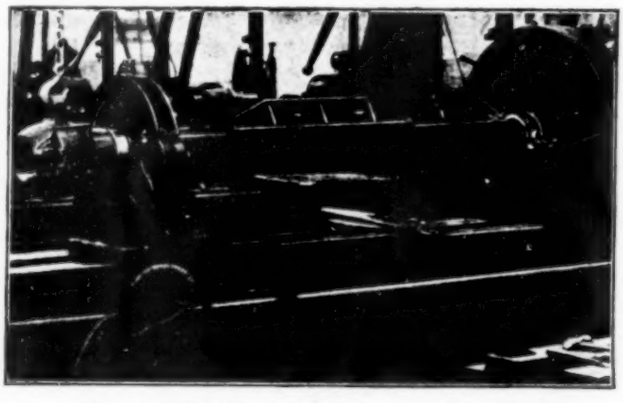


FIG. 16. SHRINKING ON THE BREECH RING

ARMY ORDNANCE NEWS

gun bodies are the same as for a new gu an ordinary repair taking the form of the removal of the A-tube in the damaged gun, reboring the jacket and repairing the webs, turning an A-tube to suit, the two being shrunk and finished as for a new gun, the clinometer plane rectified, etc. The following outline of operations is fairly complete but only those peculiar to repairs are considered in any detail, as the particulars given relating to the manufacture of the new gun will apply.

To take off the breech ring the securing screw is drilled out. To loosen and remove the breech ring itself, the gun is held in the lathe, the breech ring is surrounded by gas jets arranged on a ring, and water is run both over the jacket and through the A-tube. When the breech ring has expanded sufficiently, the lathe is started, the lug on the breech rings being clamped to the lathe bed, and thus the ring can be run off the jacket.

For taking out the A-tube the breech end of the tube is threaded for a length of 4½ in., the hole having previously been bored out to suit a plug having a threaded length of 4 in.

The gun is stood vertically on its breech end with the screwed plug inserted, the latter being connected to the water supply. Holes in the plug allow the cooling water to escape. The purpose of the plug is to take the blow of the knocking-out ram; the casting on which the gun stands permits the tube to pass through it. Around the exterior of the gun, at each 6 in. of its length, gas rings are arranged and the jacket is warmed until the webs get to a black heat. Water is admitted for about ½ min. and then a 3-in. bar of steel, about 9 ft. long with a weighty head at the top, is dropped down the A-tube by release of the catch which holds it from the crane. The bar is dropped the full length of the tube onto the screwed plug and from 6 to 12 blows usually bring the tube out. A brass ring is placed on top of the jacket so that the head of the driving bar does not damage it. If the tube cannot be removed in this way, it is placed in the boring machine and a D-bit sent through it, to increase the bore to about 4 in. in diameter. In the event of failure following this the tube is bored out completely.

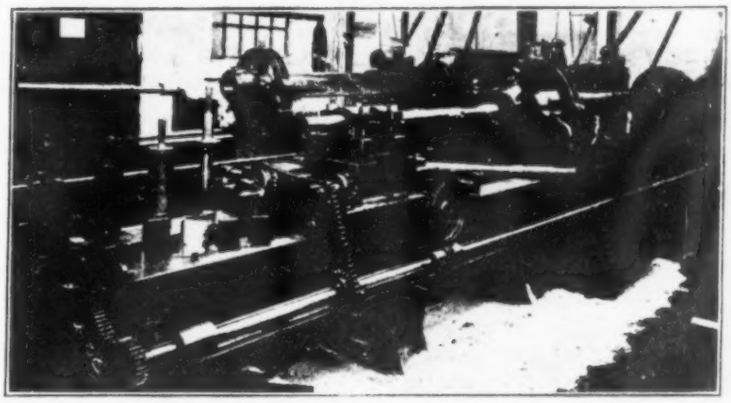


FIG. 17. FINISH-BORING THE CHAMBER

The jacket is straightened in a hydraulic press and tested by straight edge and feelers, the tolerance being 0.005 in. every 6 in. under the straight-edge. The unshrinking pit, with a gun in position, is shown in the left foreground of Fig. 18, with the straightening press behind and on the other side the heating furnaces in process of erection.

The jacket is rebored and gaged and is shrunk on a new A-tube. The gun being straightened again, the webs fitted to the body gage and alignment tested, the bearing at the breech end is ground. The bore is finished and lapped, the ends of the tube are cut to length, stamped, etc., the extractor pockets milled, the extractor-fork clearance is chipped and filed and, if the breech ring has been damaged, the end of the jacket is adjusted to suit the new ring. The last is however very seldom necessary. After the shrinking on of the breech ring the remainder of the operations follow, to the gaging of the rifling, as for a new gun.

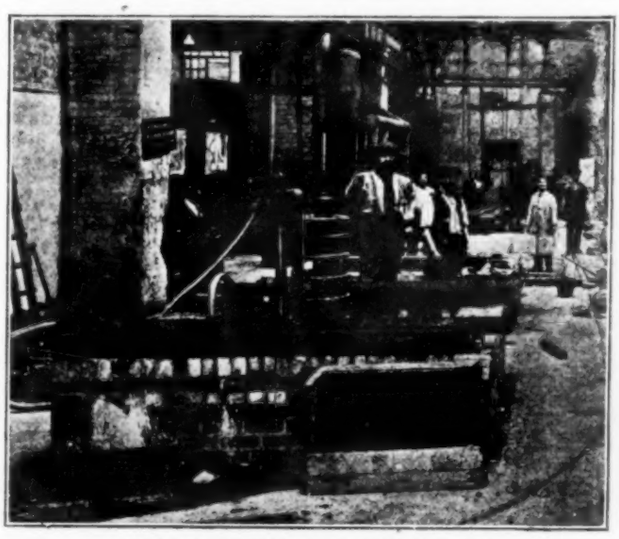


FIG. 18. THE UNSHRINKING PIT

Why Some Replies to Ads Are Ignored

By E. A. Dixie

I have occasionally been asked by friends who have answered ads in the *American Machinist* and have received no replies:

"Dixie, do you think the help-wanted ads in the *American Machinist* are genuine?"

"Of course! why do you ask?"

"Because I have answered several and have received no acknowledgment, although in most instances I have inclosed a stamp or even a stamped and addressed envelope for reply."

A few weeks ago I had occasion to insert a display ad in the *American Machinist* as follows: "Wanted, a metallurgist or hardener who can prove that he has had at least 12 years' experience with soda ash and coke in case-hardening." After reading the copy over several times, as I wished to be sure that it was explicit enough, I decided that it was about as specific as it could well be made without telling a whole lot which I did not wish to be generally known. When

the replies came in I knew I had the reason behind the statement detailed in the fourth paragraph of this article.

Just one-third of the replies *answered* the advertisement and showed that their writers had *read* and *understood* it. Two-thirds of the replies looked as though they might be answers to any other ad in the paper, but mine. However, remembering the complaints of my friends I decided to answer all of them.

I have selected two of the replies to the ad and also give my answers to them. These latter are rather longer than the answers I wrote to those who really replied to my advertisement. The first of these letters was typewritten on a regulation business letterhead. Its form is reproduced here but I have changed the names and localities so that no one's feelings will be hurt. All the words italicized in the heading appeared in the original heading in the same location.

Mechanical
Industrial
Efficiency
Production
ENGINEER

Phone: Gold Brick 314
Cable Address: Bullcon Pq

B. B. BUNK
Efficiency Headquarters
Suite 222
14 Swank St., Bull Run, Pq.
Connelsville Office 12 Sucker St. Connelsville, M.

R. 73 *American Machinist*, N. Y.
Gentlemen:

Noting your advertisement in the American Machinist for A Metallurgist or Hardener, Permit me to say that I in my travels I come across some good men and at present if
know of A man/you can get him is worth his weight in gold to any Firm that is in need of a man of his calliber, He will be at liberty very soon and I can make the appointment for you if you care to interview him.

Yours very respectively
(signed) B. B. Bunk.

The foregoing is an exact copy of the letter, spelling, construction and punctuation. From the heading I gather that the "Efficiency Headquarters" is an employment office, also that Mr. Bunk either thinks he is four kinds of an engineer or thinks he can impress others with that idea. I wonder how successful he has been in conveying this impression.

My reply to him was as follows:

Mr. B. B. Bunk
Efficiency Headquarters
Suite 222
14 Swank Street,
Bull Run, Pq.

Dear Sir:

After reading the *heading* of your letter, the *contents* appealed to me as either pathetic or a joke; I have not yet decided which.

I advertised for a Metallurgist or Hardener with a specific number of years experience with Soda Ash and Coke in case-hardening.

Probably the most prominent word in your letterhead is "Efficiency," and yet there is no sign of the exercise of efficiency in the spelling, in the grammar, in the construction, in the punctuation or in the choice of words of the body of the letter. But these do not matter, the greatest DE Ficiency is in the information conveyed.

There is not a single reference to this paragon's experience with soda ash or coke.

You tell me that "If *I* can get him" he "is worth his weight in gold to *any Firm* that is in need of a man of his calliber."

You do not even set my curiosity at rest by telling me his weight, or cubic contents. The sort of information one would expect after reading that "Head." Besides, why should I hire a man who when hired would be worth anything to "any firm?" He's got to be worth something to me or I don't hire him.

From the next sentence this paragon appears to be interned or serving a sentence, as you infer that he is to be turned loose on an unsuspecting public.

No! I don't think I care to interview him, that letterhead of *yours* "Mechanical, Industrial, Efficiency, Production, Engineer" has queered *his* chances, but if you know a guy who has *used* "his weight" in "Soda Ash and Coke for case-hardening" and has taken over 12 years to use it I will be glad to meet him either with or without "his calliber."

Yours very truly,
E. A. DIXIE.

There is nothing pretentious about the second letter. It was evidently written by a mechanic. It was well written with evident care on ordinary note paper and runs as follows:

Somewhere, May 24, 1919

Dear Sir:

Having seen your ad in the *American Machinist* that you are in need of a man to do case-hardening I thought I would write to see what you have to offer. What kind of work are you doing and what kind of a fire do you use? I have worked in a number of shops for the last 25 years and have never seen soda ash or coke used for case-hardening.

The old style was leather, then it was ground bone and the last place I worked we used compound for pack-hardening.

If you will please write me and give full particulars perhaps we might be able to make a deal.

Hoping to hear from you, I remain yours truly

D. JONES.

To Mr. D. Jones, I replied:

New York,
June 7, 1919.

Dear Sir:

I have your letter of May 24 with stamp for reply inclosed.

This letter is in answer to an ad in the *American Machinist* for a metallurgist or hardener with a certain specific number of years experience with soda ash and coke in case-hardening.

You waste six cents, your time, my time, paper, envelopes and ink, in writing a page and a half letter in which you state that you "have never seen soda ash or coke used for case-hardening."

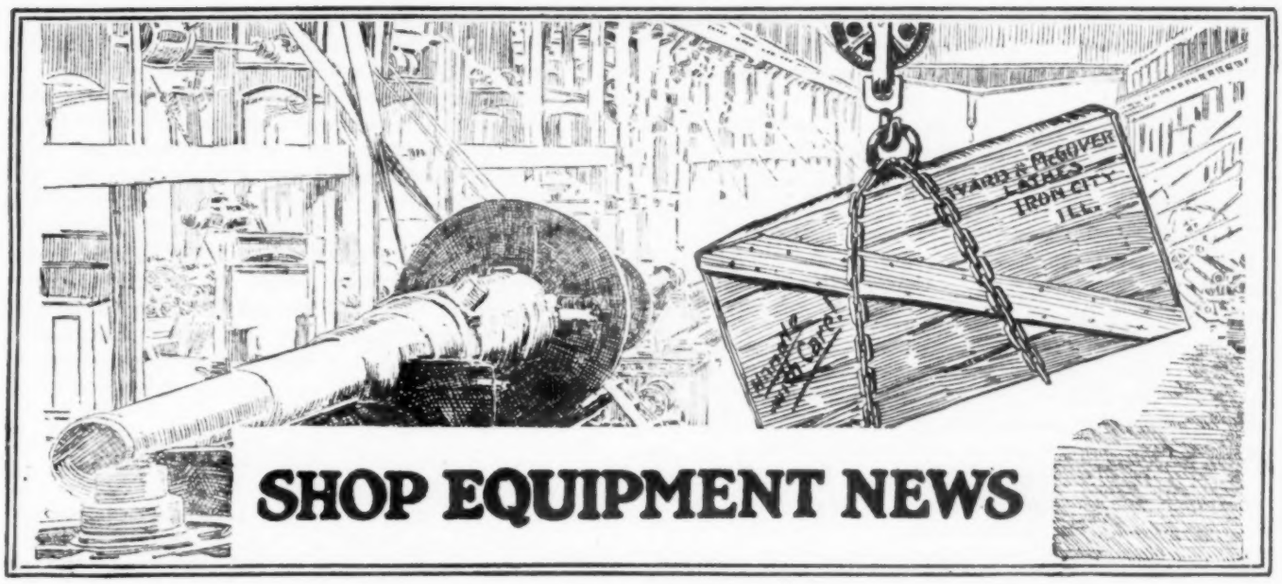
You then go on to tell me several things about case-hardening which I already know but which have no bearing on the information requested in the ad.

You may be the most expert hardener in the United States, but if you cannot prove that you have had the requisite number of years experience in case-hardening *with soda ash and coke* you are not the man I am looking for.

The next time you answer an ad read it and note the requirements. If you cannot fulfill them don't answer it.

Yours very truly,
E. A. DIXIE.

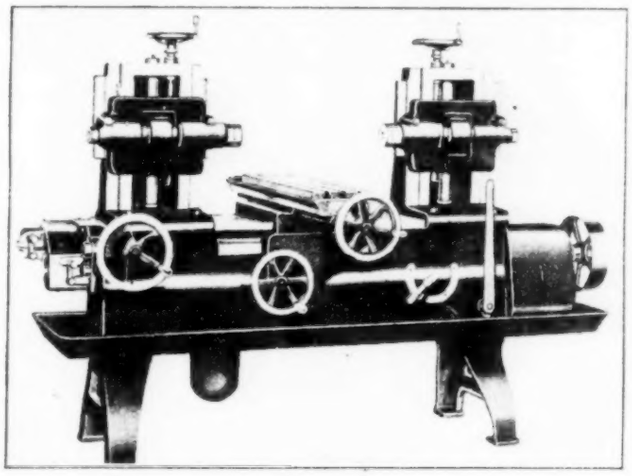
All of those who replied to but did not *answer* the ad got about the same medicine and I hope it will do them good. The sarcasm in my letters was meant to bite, not because I bear these men a grudge but because I really want to do them a good turn. The average man will forget praise but the memory of the man who has been laughed at is usually very long and I feel sure that the next ad answered by them will be understood or not answered at all.



Knight Duplex Milling Machine

The Duplex milling machine illustrated is the product of the W. B. Knight Machinery Co., 3920 West Pine St., St. Louis, Mo.

The machine was designed to obtain increased output with fewer operations and is built with two spindle heads, each bearing a spindle capable of independent operation, thus permitting both sides of the work to be finished at one time. The uprights are liberally proportioned to withstand stress and the inside face of each is graduated so that the spindle heads can be raised or lowered accurately by means of a handwheel at the top. There is a graduated set collar on the hub of each handwheel that is also helpful when accurately adjusting the spindle heads. When the heads are set, rigidity is secured by clamping them to the uprights which are in turn clamped to the bed. The saddle can also be clamped to the bed, thus making the entire machine equivalent to solid construction. A feature of design is the table construction, the slideways on the saddle being at the top instead of at the bottom of the dovetail thus providing larger bearing surfaces spaced far apart which greatly add to the stability of the unit.



KNIGHT DUPLEX MILLING MACHINE

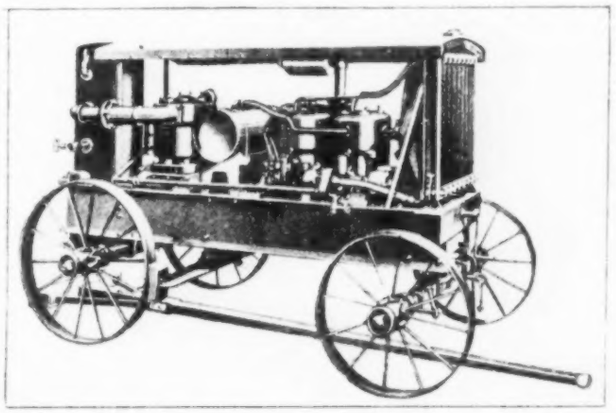
Specifications: Maximum distance between spindles, 26 in.; vertical adjustment, 10 in.; diameter of tapered spindles, 2⅜ to 1⅝ in.; length of bearings, 9½ in.; spindle speeds, eight; range, 30 to 300; taper holes, B & S taper No. 10; working surface of table, 37 in. x 10 in.; longitudinal feed, 24 in.; number of feeds, six; range (per revolution of spindle), 0.008 in. to 0.060 in.; floor space, 103 x 84 in.; net weight, about, 3450 lb.

The machine is recommended by the makers for the rapid milling of duplicate parts on a production basis and is said to be particularly suitable for milling the frames of typewriters, adding machines, also engine cylinders and other such work where opposite sides must be perfectly parallel.

"Imperial Type 14" Portable Air Compressor

The Ingersoll-Rand Co., 11 Broadway, New York City, has recently introduced a light-weight, gasoline-engine-driven unit, built in two sizes, to be known as the Imperial Type 14 portable compressor.

These are all-steel outfits, from their sheet-steel canopy to the broad-tired steel wheels. The power plant of each consists of a duplex vertical compressor, driven at high speed by a four cylinder, four-cycle, tractor-type gasoline motor. It is pointed out that the outfit, being designed especially for portable use, has had unnecessary weight eliminated and affords maximum air power output per unit weight. The larger machine of 210-cu.ft. capacity weighs only 6000 lb. and the 118-cu.ft. unit, 4000 lb. A point is also made of the fact that gasoline motor drive provides power in



PORTABLE AIR COMPRESSOR

economical form and in a mechanism that can be conndently intrusted to the average operator, for men familiar with gasoline engines are everywhere available.

The compressors are provided with inlet unloading devices which automatically close the compressor intake when the receiver pressure rises above a predetermined limit, and permit the machine to again take up its load when the pressure has fallen a definite amount.

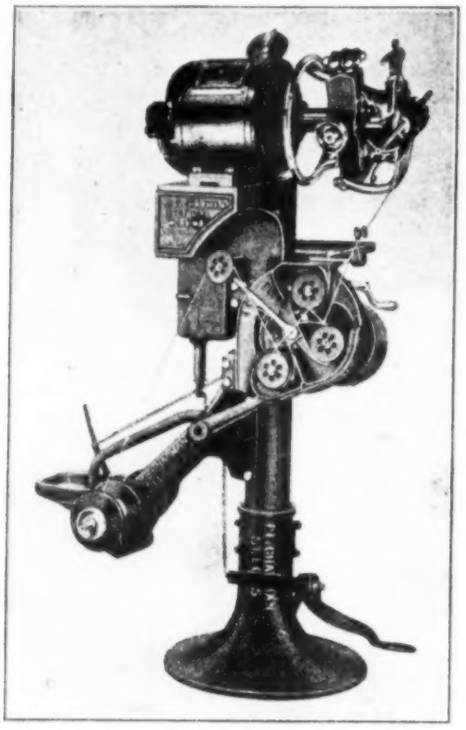
The gasoline driving motors are of long-stroke type, and operate at medium speed. They are equipped with high-tension magneto ignition with automatic governors to maintain constant speed under all working conditions and to prevent overspeeding when idling. A splash oiling system lubricates all moving parts. The starting crank is located at the front of the machine beneath the radiator.

Both compressor and driving motor are water cooled by a circulating system, with centrifugal pump, large radiator and powerful blast fan.

Each of these units is equipped complete with receiver, safety valve, drain valves, pressure gage and service valves to which the air-hose lines may be attached. When the fuel tank has been filled, lubricating oil provided and the cooling system supplied with water, the units are ready for work. Steel panels are provided that totally inclose the unit and protect it from the weather or meddlers.

Chapman Style 3 Armature Winding Machines

The P. E. Chapman Electrical Works, St. Louis, Mo., announces an improved model of the Chapman adjustable, bipolar-drum armature winding machine in their style 3 as shown herewith. This model is readily adjustable to any style and size of random-wound, bipolar-drum armature, and any size of wire from No. 20 to No. 36. The machine is said to have special lead-forming and handling features and to wind a large amount of wire into the armature slots without pounding. It is of the self-contained type and includes all parts such as motor, controller, turn counter, etc. The reel holder is automatic and controlled by a dynamometer. The tension device is designed to avoid spool trouble and permits quick starting, high speed, good tension and quick stops. The reel holder and tension device are adjusted simultaneously for any size of wire by a simple crank and, once adjusted, needs no further attention until the reel is empty. The machine is recommended by the makers for the repair shop, and the factory, also for winding field coils as well as a large variety of armatures.



STYLE 3 ARMATURE WINDING MACHINE

Steel-Clad Transformers

Announcement is made of an improved line of distribution transformers, the chief advantage claimed being a reduction in weight of over one-third by the substitution of a welded sheet-steel case for one of cast-iron.

This line is designated as the Steel-Clad type "S" transformer and is manufactured by the Westinghouse Electric and Manufacturing Co., East Pittsburgh, Penn. No change has been made in the coil construction and insulation of the type "S" design which has been on the market for many years, but an improvement has been effected in the tank construction which is the result of seven year's experimentation and development. It is claimed that a construction has been achieved which combines the light weight desired with the requisite degree of strength and rigidity and, furthermore, includes a treatment and finish of the tank service which renders it thoroughly weatherproof.

WESTINGHOUSE STEEL-CLAD TRANSFORMER

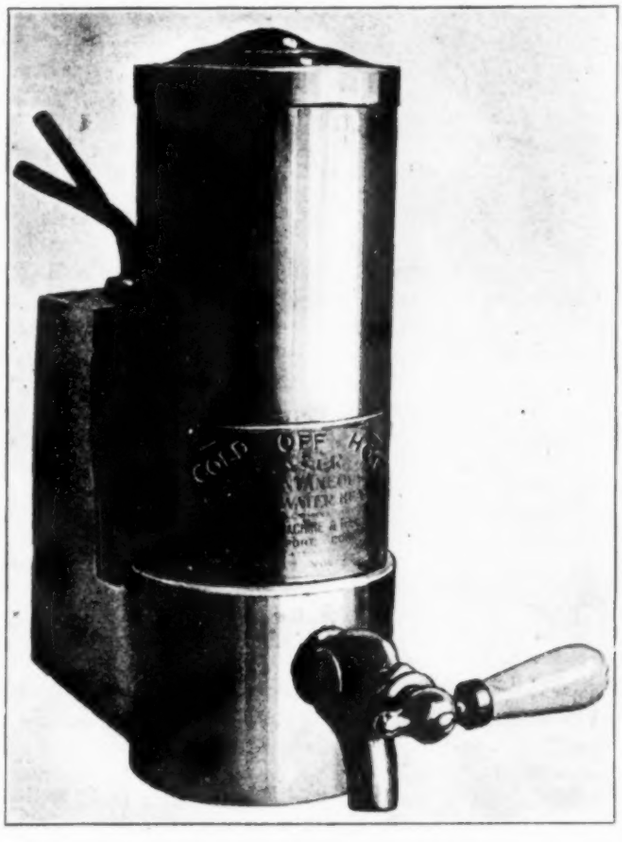
The ease and cheapness with which distribution transfers can be shipped, handled and installed, is to a large degree a question of weight. Further, since distribution

transformers are usually mounted on the line poles, heavy transformers are particularly objectionable, not only because of the difficulty involved in raising them into position for hanger-iron mounting, but also because of the strain that is put upon the pole and cross-arms. The distance from the centre of gravity of the transformer to the centre of the pole is a matter of almost as much importance from the point of strain on the pole and cross-arms as the weight itself. The reduction in weight effected in the steel-clad transformers permits of mounting larger transformers directly on poles without building a platform.

The material selected for the manufacture of the tanks, covers and end frames is a special grade of sheet steel particularly adapted to the conditions of manufacture and service. The color of the finishing coat is a battleship gray, giving a smooth, attractive finish. This color is an improvement over the black which has hitherto been used for distribution transformers, and that has contributed to the unsightly appearance of streets and alleys.

"Everhot" Water Heater

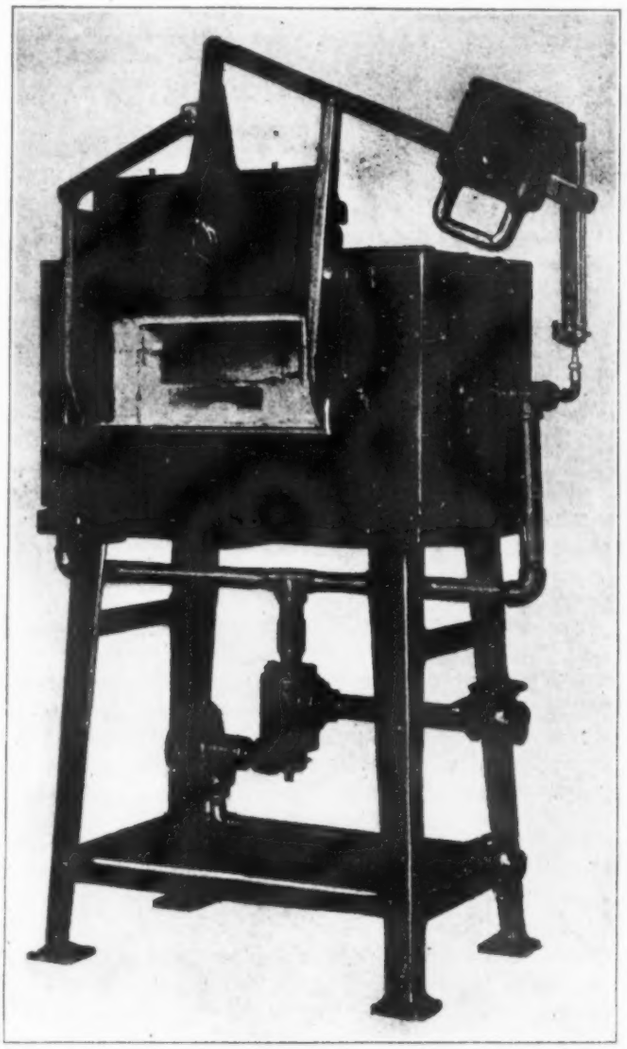
An automatic electric device for heating water by simply turning the faucet is manufactured by the Bridgeport Machine and Tool Manufacturing Co., Bridgeport, Conn. It is designed to give the same result as the automatic gas heater; that is, instantaneous hot water. It has the advantage, however, of small size and simplicity, as it requires no extra piping, being attached at the connection in place of the regular faucet and the electrical connection requires but two wires, the same as an ordinary light fixture. Unlike the gas heater this device will furnish either hot or cold water, according to the direction the handle is turned, which is a material advantage where there is but a single faucet, and saving a pipe line in the case of a new installation. The heater being automatic takes current only when supplying hot water, which it is said to furnish at the rate of 90 gal. per hour, with a current consumption of 6.6 kw. per hour. It is adapted for standard voltages of 110 or 220, and can be furnished for special voltages when required. The heater has a wide range of usefulness and weighs, complete, 21 pounds.



"EVERHOT" WATER HEATER

Surface Co., Oven-Type Furnace

The A-25 oven-type furnace, designed for a great variety of work over a wide range of temperatures and manufactured by the Surface Combustion Co., 366 Gerard Ave., New York, has several features of interest. The door-lifting mechanism, as may be seen, does not require the use of chains or pulleys, but is a simple, compact link motion having a dead-center feature that tends to keep the door in either open or closed position without depending upon friction. It



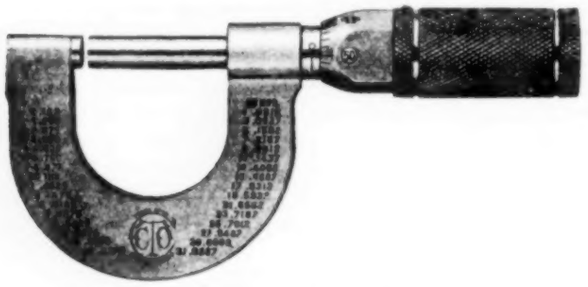
MODEL A-25 OVEN-TYPE FURNACE

Specifications: Inside heating space, 12 x 10 in.; size of entrance, 6½ x 10 in.; height floor to hearth, 42 in.; air pipe, 2 in.; gas pipe, 1¼ in.; floor space, 27 x 48 in.; net weight, 1700 lb.

is the equivalent of a crosshead guide with the added advantage of a pin friction and adjustable counterweight, and the door cannot travel otherwise except vertically. Another feature is the automatic gas proportioner that at all times gives a correct mixture of gas and air by the use of a single valve. To increase the heat, the valve is opened, and to decrease the heat, the valve is closed; the proportioner automatically regulates the mixture independently of the operator. The furnace is particularly recommended by the makers for the heat-treatment of carbon steel and high-speed steel.

Direct-Reading Micrometer

The micrometer being marketed by the Production Equipment Co., Inc., 1 Madison Ave., New York City, is said to be very easy to read as the barrel has but 10 graduations instead of 40 and the dial windows



DIRECT-READING MICROMETER

show at a glance the measurement registered. The micrometer is of standard size and weight comparatively, and is made in sizes up to 12 in., with or without ratchet stops and ten-thousandth graduations.

Control of Orders In Process

BY PETER F. O'SHEA

A compact summary of just what orders are in process in the factory at a given time, the dates they were received, and the number of orders being shipped, is desirable for every factory manager. A statistical summation which can be read at a glance is convenient to give an idea of the progress being made, but to this in many cases should be added detailed knowledge of particular orders and cases.

The manager of the special-tap plant, of the Greenfield Tap and Die Corp., which has about 500 orders in the shop at one time, uses a very concise method of controlling them. It consists of two forms, the first of which is a single sheet for each day. Each morning a clerk types out a fresh summary of the number of orders still in the shop. These are listed and divided as shown in the illustration. The number of orders finished yesterday, the number of orders which came in yesterday, and the number in process in the shop, is shown briefly.

These orders are divided into two classes; stock orders, and special orders made on specifications from the customer.

In the tap and die industry for example, all left-hand threads and all threads in which the pitch is in millimeters, are considered special. They are made in lots small enough to exclude them from quantity production at the regular plant, but still large enough so that, in the smaller special-tap plant, they can be made for stock as a balance wheel. The stock orders can be interrupted or postponed at any time.

But it is necessary to know more than what orders came in and went out today. How many orders are in process? How old are the orders in the shop? The lower section of the daily report answers these.

The orders in the shop are analyzed according to the month in which the customers' orders reached the factory, the earliest month found being listed first.

The second form is monthly, and is like the list frequently used by shipping clerks. It is prepared on the first of each month, and is a complete detailed list of the orders then in the shop listed by order numbers with the earliest dates first. The date of each order, the name of each customer, what the order is for, are all set down in one line, in single-space typewriting.

This list covers several sheets of paper which are clipped together, and copies always lie on the desks of the works manager and assistant works manager. When

Daily Report of Special Orders, Regular Shortages, and Stock Orders

Date March 3 1919

Special orders issued this date 21

Stock orders issued this date 0 Total 21

Special orders finished this date 21

Stock orders finished this date 4 Total 25

Total number of all orders on hand 410

MONTH	STOCK ORDERS			SPECIAL ORDERS			GRAND TOTAL
	Added	Finished	Total	Added	Finished	Total	
1918							
December			3				3
1919							
January		3	15		2	29	44
February		1	184		17	160	344
March				21	2	19	19
Totals		4	202	21	21	206	410

DAILY REPORT OF SPECIAL ORDERS.

any order is reported as complete the works manager draws a line through that order on the list, right across the page. As the month goes on, more and more orders are crossed off, and more pencil lines are added until by the end of the month the page looks pretty black. Then, a white space left means an order uncompleted. Especially does a white space near the beginning of the list—an order originating in an early month—pain everybody who looks at it, until it is crossed out. On this sheet the manager has the whole factory lying before him in detail. By adding to it the daily summary first mentioned, the manager keeps constantly in touch with the work.

This is really a dispatch system on two sheets. It keeps individual orders from lagging behind, no matter what the cause, and herds all orders forward together like sheep—keeping them moving in a body.

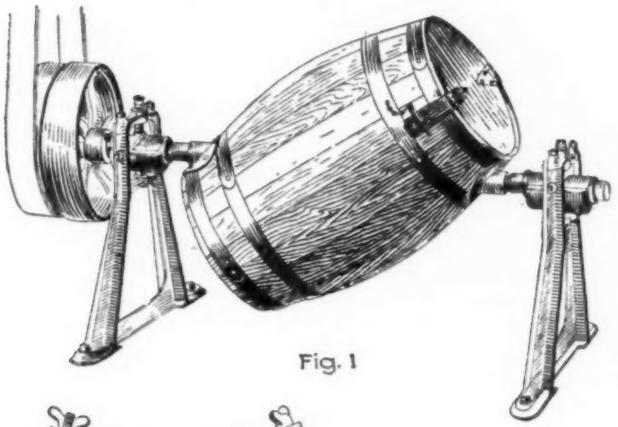
The minute an order gets behind it becomes a target. Knowledge of which orders are targets is general in the shops. It gets results from the workmen as it does from the works manager and a very valuable help in getting goods delivered to the customer on time.

A Cheap and Efficient Tumbling Barrel

By Wm. Older

The article on page 1170, Vol. 50, brings to mind a somewhat similar tumbling barrel, Fig. 1, which was improvised in the shop in the days when it was small and the boss thought it was cheaper to make than to buy. Havings the trunnions on the sides of the barrel and at right angles to the axis of it gives a too abrupt tumbling action for some work.

Our barrel was made from an old keg because of its stoutness (maybe it was a stout keg). One head was used as a door. This was fitted and attached to the barrel by one heavy strap hinge. Opposite the hinged



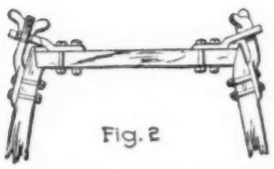


FIG. 1. BEER KEG AS A DIAGONAL TUMBLING BARREL
FIG. 2. A HEAD FOR WET TUMBLING

side of the head, a heavy hasp was attached and so arranged that a wedge, which held it shut, forced the door to its seat in the end of the barrel. The trunnions were made from two 45-deg. malleable-iron pipe flanges which were roughly hammered to the curve of the barrel and bolted through the staves near each end. A piece of cold-rolled shafting was threaded to fit each of the flanges. Before bolting the flanges onto the barrel they were heated and the cold-rolled trunnions screwed in. When the flanges shrunk on cooling, the two pieces were practically one. However, a cross hole was drilled and reamed and a taper pin driven in and riveted over to make sure that they would not jar loose with the vibration. For our work this type of tumbling barrel gave better results as the work is given a sort of sliding movement and not an abrupt tumbling action as is the case with the one shown on page 1170.

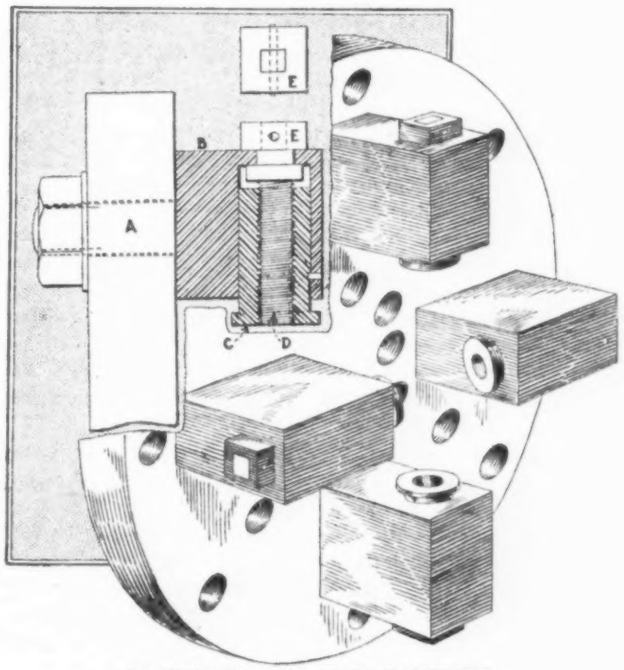
The barrel will be better supported if the shaft passes entirely through from side to side. Having the door the size of the head permits easy loading and discharging and the entire interior of the barrel can be inspected far better than it can with a door on the side no matter how large it may be made. Where heavy work is being tumbled the side door is also apt to weaken the barrel too much. The bung hole was plugged and a piece of sheet iron bolted over it.

We never did any wet tumbling but if we had had such work to do I think it might very easily have been managed by using either a hinge with a very loose joint together with clamps and hand-operated nuts or by dispensing with the hinge and using clamps only as shown in Fig. 2. There is no doubt that the keg had done a lot of very wet tumbling before we reformed it.

Canadian Substitute for a Lathe Chuck

By Charles Canec

"Les Poupées" is the name given by French-Canadians to a device used in place of the lathe chuck, a description of which may prove interesting to those readers of the *American Machinist* who have not seen them in use.



FACEPLATE AND "LES POUPEES"

The writer first came across them in an old established shop doing machine work on the banks of the St. Lawrence. There were a number of old lathes in the shop with faceplates of from 22 to 50 in. in diameter which were drilled with rows of holes as shown in the sketch instead of having the usual slots.

The poupée is made from a steel forging, the shank *A* in the sketch being turned to suit the drilled holes and thickness of the faceplate. Part *B* is squared up as shown and bored to receive the plunger *C* which is a sliding fit in *B* and provided with a keyway to prevent it from turning. By means of the screw *D*, the plunger *C* is made to work in and out of the block, the screw having a square head made by fitting a square collar onto the squared end of the screw as shown at *E*. A pin is sufficient to keep this collar in place when drawing the plunger into the block.

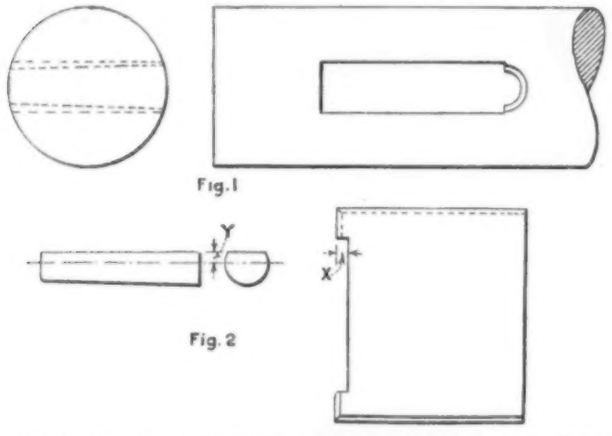
A set of four poupées fastened to the faceplate as shown makes a serviceable chuck which can be used on a large variety of work and will be found rigid and strong, though not to be compared with the chuck for convenience.

Taper-Pin Wedge for Boring Bar

BY S. B. ROYAL

Allow me to uphold my article on the above subject printed on page 1195, Vol. 50, of *American Machinist*, and show the error of Mr. Dixie's criticism on page 88, Vol. 51.

It can and has been done and it is far quicker and cheaper than the method he suggests, as the hole does not have to be drilled at an angle and everything is



FIGS. 1 AND 2. HOLDING CUTTER IN BORING BAR WITH TAPER-IN WEDGE

standard. Drill and ream the taper-pin hole of the required size at right angles to the axis of the boring bar and cut the slot for the cutter as in Fig. 1. The size of pin to use should be such that the diameter of the large end will be slightly less than the width of the cutter. Also the slot for the cutter should extend to the center line of the hole.

The taper pin is flatted parallel with its axis and the back of the cutter is left square and not tapered as Mr. Dixie states is necessary. The amount the front end of the cutter is cut back *X*, Fig. 2, must be slightly less than *Y*, and this will be sufficient for all sizes, for as the diameter of the cutter increases so does its width and also the diameter of the taper pin. The taper pin will in every case be strong enough, as the only work put on it is compression.

During the war we used hundreds of boring bars. We tried several methods of fastening and gave all up for this one as it proved to be the cheapest and quickest made. Everything is standard, the cutter being made from bar stock of the correct width and the sides are thus approximately parallel without much finishing.

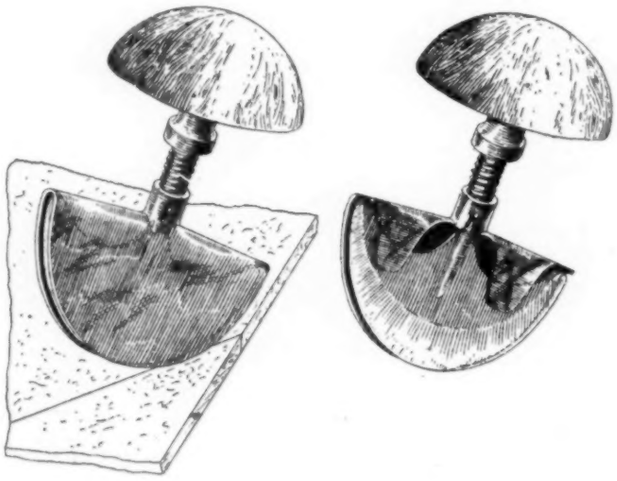
[It is evidently Mr. Royal's intention to have the taper-pin wedge stop against the cutter just before reaching its true seat in the taper hole. While the method is perfectly feasible as an emergency job, we should not recommend it for permanent work.—EDITOR.]

A Guard for a Belt Knife

BY WILLIAM DENTON

There is a peculiarly wicked-looking knife in common use by belt makers and belt repairmen that, from its direful possibilities, really merits consideration from the zealous "safety-firster." This knife is shown, muzzled, in the accompanying illustration.

It has a semicircular blade with an edge of razor-like sharpness presented at all angles, ready to take a slice off from any unwary thumb or finger brought into



TWO WAYS OF GUARDING A BELT KNIFE

contact with it, whether in its proper place in the tool kit or lying carelessly on the bench. The knife is used to cut or trim the ends of belts by giving the blade a rocking movement across the leather or for scarfing or "skiving" in the process of making a lapped joint.

The pictures show two ways of guarding the edge, either of which make it practically impossible for the user to cut himself without devoting both hands to the job.

The first, and safest, form of guard covers the blade completely with a sheet-metal shell made from cold-rolled steel or brass of a suitable gage. The guard is so made that when in extreme outward position, in which position it is held by a light coiled spring, it projects beyond the knife edge about $\frac{1}{32}$ inch.

When used for trimming or cutting-off, the normal pressure pushes back the guard, allowing the blade to do its work with no more attention from the user than if the guard were not there.

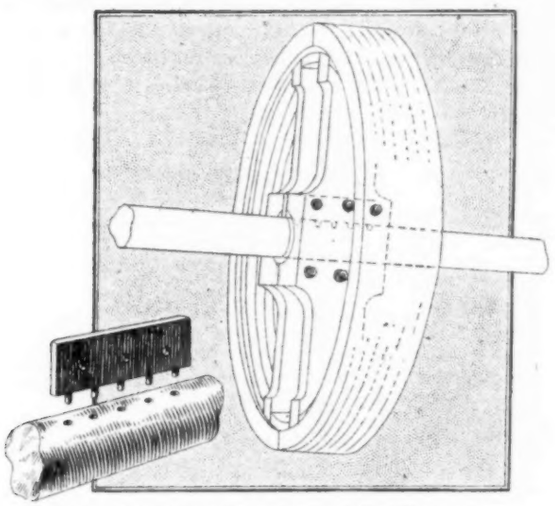
When used for scarfing, in which operation the blade is held nearly flatwise in relation to the belt, the other form of guard is preferable. For this purpose the blade

should be beveled one way only and the guard closely fitted to the flat side. A sliding pin in the collar holds the guard back out of the way when desired, or it may be provided with a suitable hook to enable it to be held back by the forefinger.

Keying A Wood Pulley

BY WILLIAM DENTON

It is sometimes difficult to make a wood pulley hold to the shaft when it is driving up to the limit of its capacity, and the millwright generally resorts to the strategy of a piece of sandpaper wrapped around the shaft under the hub of the pulley. This does not improve the fit of the pulley upon the shaft and not infrequently fails to accomplish its purpose.



KEY FOR A WOOD PULLEY

A quick and easy way of securing a positive drive is shown in the illustration. Five or six shallow holes (or more, according to the length of the pulley hub) are drilled in the shaft and a flat piece of iron machined as indicated, with tenons along one edge to match the holes. The thickness of the iron and consequently the diameter of the holes in the shaft) should be just sufficient to allow the piece to squeeze tight between the halves of the pulley when the latter is tightened upon the shaft.

Holes should be drilled in the iron to allow the hub bolts of the pulley to pass through and the iron clamped in position with the tenons entering the holes in the shaft.

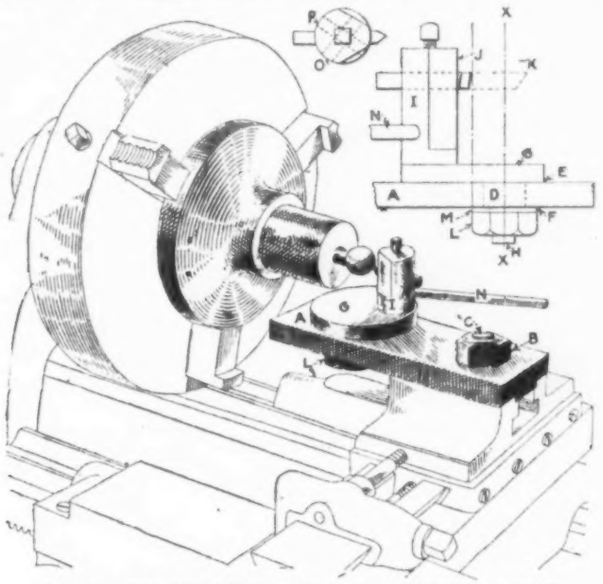
If this device is properly looked after and the bolts kept tight, nothing short of the destruction of the pulley will interfere with its operation.

A Radius Turning Tool

BY E. A. DIXIE

The radius tool shown on page 1140, Vol. 50, reminds me of some radius turning tools I made for turning male and female radii a good many years ago. In principle these tools were the same as that shown by Mr. Grimes.

The plate *A* was about ½ in. thick by 3 in. wide and was drilled at *B* for the holding-down bolt *C* which secured it to the tool slide of the lathe. The other end had a hole bored and reamed at *D*. This was done in a lathe and at the same time the faces *E* and *F* were cleaned up parallel with each other and square with the hole *D*. The center of the hole *D* is coincident with the center of the arc to be turned. The member *G* was made of a piece of cold-drawn stock. It was chucked and on one side of the flange *G* the stem *H* was turned and threaded. The body of the stem *H* was a snug turning fit in the hole *D* in the member *A*. The other side of the flange *G* had the toolpost *I* turned on it.



TOOL FOR TURNING MALE OR FEMALE RADII

The toolpost *I* was diametrically opposite the stem *H*. Several of these members *G* were made with varying distances from the face *J*, of the toolpost *I*, to the center line *XX* of the stem *H*. In this way various male radii could be turned with the tool set as shown in the illustration.

With the tool reversed in the toolpost and the member *G* turned 180 deg., female radii were turned. For the smaller female radii the tool was advanced beyond the center line *XX*, as shown by the dotted lines at *K*. Of course, with the toolpost shown, the overhang of the tool is excessive but it must be remembered that there were a number of the members *G* all of which fitted the member *A*. The time necessary to change from one toolpost to another occupied the time necessary to remove the nut *L* and key washer *M*, remove the unsuitable member *G* and substitute the correct one. The sides of the toolposts were milled off at an angle as shown to avoid interference, which under certain conditions took place before this was done.

To turn the member *G* a bar *N* is used. This entered either of two holes *O* or *P* drilled through the toolpost *I*. The faces *J* of the various toolposts were made some positive distance from the center line *XX*. This distance was stamped on the toolpost and assisted materially in setting the tool to cut the desired arc.

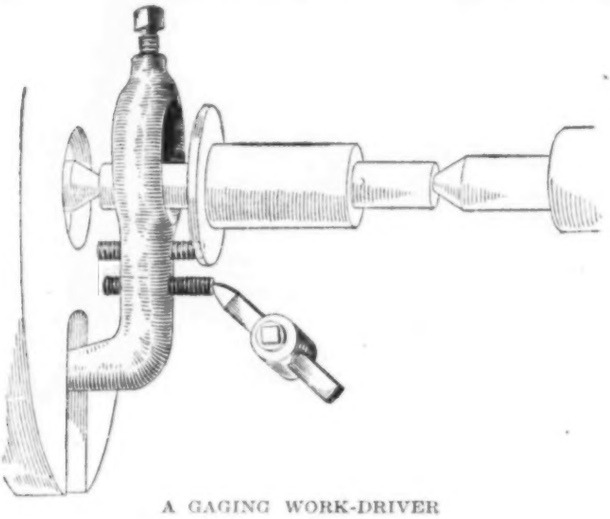
A Dog for Gaging as Well as Driving

BY BEN FRANTZREB

A large number of pieces like that shown in the sketch had to be made, in which the thickness of the flange or disk was of importance. The finish on this part was by grinding and it was desirable to maintain a uniform grinding allowance. The lathe man had to work very carefully and a lot of time was being wasted in "miking" the thickness when reducing it by the cut-and-try method.

To save some of this time the writer made the dog which is also shown in the sketch. The two hardened setscrews were ground flat on the point and were made a tight fit in the tapped holes so they would not shift their position.

When the dog is put on the work, the finished outer face of the disk is brought to bear against the point of the inner screw. The outer screw projects beyond the inner one by a distance equal to the thickness of the



A GAGING WORK-DRIVER

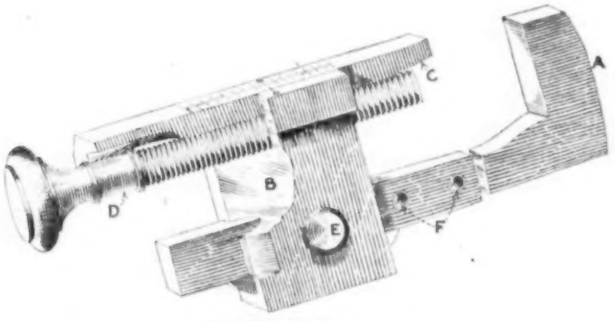
flange plus grinding allowance, so that when the operator is ready to take the final cut over the inner surface he stops the lathe, sets the cutting tool against the point of the outer screw, and, starting the lathe, feeds the tool straight in.

In this way the thickness is brought within the limits on the first trial, and there is no necessity for careful measuring.

An Injector Gage

BY M. KESTER

The repeated refacing of the steam-nozzle seat of various locomotive injectors allows the nozzle to project into the combining chamber to the extent that the efficiency of the injector is impaired. It was found that a brass liner inserted between the nozzle and its seat would eliminate the trouble and the gage herein described was designed to determine the thickness of



AN INJECTOR GAGE

the liner required to maintain the correct relation of the different injector details.

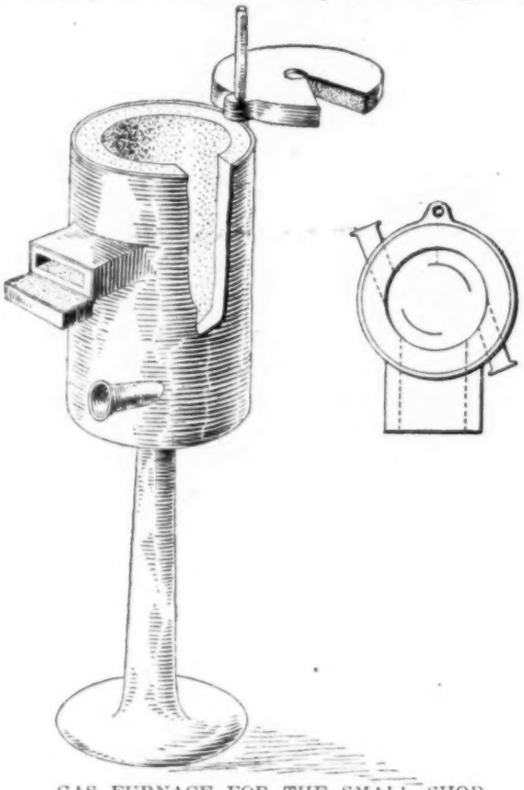
As shown in the drawing, the gage consists of an adjustable jaw *A*, and a bracket *B*, on which is mounted an indicating slider *C*, actuated by the adjusting screw *D*. By shifting the bracket along the leg of the jaw and stopping by means of the taper pin *E* in the holes *F*, the gage can be set for each class of injector, the distance between the jaw and the bracket being constant for each injector. After dismantling all the removable parts, the gage is inserted into the body of the injector and the jaw held tightly against the check-valve seat near the delivery end while the slider is adjusted to bear against the refaced steam-nozzle seat. The reading of the scale will show the thickness of the liner required.

A Homemade Gas Furnace

BY A. H. YOCH

The accompanying sketch shows a small gas furnace suitable for heating tools, etc., that may be made by any mechanic who is handy with the oxy-acetylene welding torch. The materials used are available in almost any small jobbing shop.

The body is made from a piece of large-diameter



GAS FURNACE FOR THE SMALL SHOP

pipe or may be made of sheet metal bent to the desired shape and size.

The opening at the side is formed of sheet metal by welding and attached to the body of the furnace by the same means. A hinged cover and swinging lid are provided.

A cast-iron pedestal forms an ideal means of support, but is not a necessity as the furnace may be set on firebricks on the bench or supported in any suitable manner.

Two or more burners should be supplied and should be given a slight upward tilt to cause the flame to sweep upward in a spiral course.

After the metal parts are all welded up, the whole should be lined with fireclay of suitable thickness to retain the heat and prevent burning the metal parts.

Gas or fuel oil may be used by providing suitable burners.

This is our delayed issue of Oct. 16, 1919. This news is however up to date, having been prepared for our Oct. 23 issue

Sparks from Industry's Forge

Edited by E. C. Porter

Ideal Electric Works Holds Sales Conference

The following representatives of the Ideal Electric and Manufacturing Co. took part in a sales conference at the Mansfield Works, Mansfield, Ohio, during the week of Aug. 11, 1919: S. Glen Vinson, secretary and general manager; L. S. Meeker, sales manager; T. Weiss, of the Milwaukee office; C. A. Kuehn, of the Cleveland office; James Kent, of the Chicago office; R. F. Geeseka, of the Minneapolis, and H. J. Brewer, of the New York office.

In addition to the discussion of sales matters, the social side of the conference was a source of much pleasure to the "ideal" men. Mr. Meeker took the different representatives through the plant explaining the details for the new types of motors under construction. From every point of view, the conference afforded much benefit as well as pleasure and the Ideal Electric and Manufacturing Co. is already making plans for an elaborate conference at some later date.

Chain Company Forms Mutual Benefit Society for Employees

The Dominion Chain Co., Niagara Falls, Ont., Can., has taken steps toward forming a mutual benefit society among its employees. The society is open to voluntary enrollment of all members in both factory and offices. The business of the society will be conducted entirely by its own members. The members pay one dollar upon entrance and fifty cents per month, which is used to pay a sick and death benefit.

War Department Preparing Book on Shipping

The War Department is preparing a book on efficiency engineering as applied to economies in shipping space during the war. The book is being compiled by industrial and engineering specialists and by some of the experienced officers of the regular army, and it is expected to materially affect the shipping method in peace time.

This book will furnish much data regarding the shipment of machinery; machinery shipments presented more difficulties than any other class of freight. Each shipment required individual study to judge the problem when assembly, breakage, interchangeability of parts, permissible weight and ease of handling were among the things that had to be considered.

Standard trucks and passenger cars which normally occupied from 1200 to 1500 cu.ft. finally were knocked down and crated in such a manner as to occupy only one-fourth of that space. Packing and crating mobile artillery presented peculiar conditions, but the results obtained brought about much saving of space, the saving of packing material and much safer carriage.

Inaugurates Training Course for Employees

The Hyatt Roller Bearing Co. has inaugurated at its Newark factory, which employs over 4000 men, a plan for training foremen and other executives. H. E. K'Burg, who is in charge of personnel work for the company, has laid out an educational program for all employees, and as an initial step in their work, has instituted a basic course of training for men in supervisory capacity. A group of about 100 men will take the course. The subjects covered will be teamwork, handling men, organization, machinery and materials, production records, and management. The course will comprise the study of textbooks on the above subjects and the solution of typical factory problems relating to the texts. The training is under the supervision of the Business Training Corp. of New York.

National Machine Tool Builders Association Hold Fall Meeting

The National Machine Tool Builders Association held its annual fall meeting at the Hotel Astor, New York, Oct. 15 and 16. All the officers were reelected for the coming year. Addresses were made by Bainbridge Colby on International Trade; George Barry Mollon on International Finance and Exchange, and Alexander Luchars on Foreign Trade Conditions. Colonel Lamar commented on Mr. Luchar's paper. Most of the members of the association said that they had orders far ahead of production.

Two New Offices Open Up

The Mechanical Appliance Co., makers of Watson electric motors, with factory and main offices at Milwaukee, Wis., has recently opened up new offices in Buffalo and St. Louis.

W. C. Winterroth, formerly connected with the Chicago office, will be located at 318 Prudential Building, Buffalo, as district sales manager for western New York.

The St. Louis office will be in charge of L. F. Mahler, who has been recently appointed district sales agent for St. Louis and adjacent territory. His office is located at 1039 Syndicate Trust Bldg., St. Louis.

Newton Machine-Tool Works Constructing a New Building

The Newton Machine Tool Works, Inc., Twenty-third and Vine Sts., Philadelphia, Penn., has begun the construction of a new shop covering a ground space of 400 x 230 ft. It will include an erection pattern storage and forge shop, and a power plant. The erection shop is to have one square foot of overhead light for every square foot of floor space, and is to be used for erecting machinery on a quantity-production basis. This shop will be fitted with 50-ft.-span overhead cranes.

New Plant for the "Dalton Six"

The Dalton Manufacturing Corp., 1915 Park Ave., New York City, expects to occupy its new plant early in February. The plant being built at Sound Beach, Conn., near the main line of the New York, New Haven and Hartford Railroad, was started last June and will be complete in all details. Eight buildings in all are being erected, the largest being 410 x 101 ft. These are located in a tract of 7½ acres that are laid out and will be decorated by landscape experts with the idea of making the grounds very attractive. The buildings will be furnished throughout with the very best of modern equipment. A central power house will generate power for the entire plant and the heat-treating and hardening plant will generate its own supply of gas from hard coal. Individual motor drive will be provided for the large machines, but the small machines will be arranged for group drive. The corporation is now negotiating for 50 homes for its workmen.

Give Liberty Bonds to Employees

The West Boylston Manufacturing Co., located at Easthampton, Mass., has given its employees Liberty Bonds amounting to over $100,000. This is being done to fulfill the company's offer during the last loan campaign to give a $50 bond for each $50 bond purchased by its employees.

This company is building a large recreation hall near the plant for the exclusive use of its employees.

Changes in Business of American Conduit Manufacturing Co.

The General Electric Co. has leased the rigid-conduit business of the American Conduit Co., of New Kensington, Penn., and this business will be conducted by the Sprague Electric Works.

The Galvanite and American brands of rigid conduit will be continued, and no change is contemplated in the terms or conditions under which the trade has been

dealing with the American Conduit Manufacturing Co.

"There will be no change in the personnel of the American Conduit Manufacturing Co.," announces D. Hayes Murphy, president, "but the name will be changed to the American Wiremold Co., which will concentrate upon the manufacture of Wiremold surface raceway and Wireduct non-metallic tubing, at Hartford, Conn.

Harry B. Kirkland, vice president, will divide his time between the Sprague Electric Works, 527 West Thirty-fourth St., New York City, and the American Wiremold Co., and will continue to give personal attention to his old customers.

Complaint From Australia on the Misuse of the Term "F.O.B. New York"

Correspondence from Australia has reached the National Foreign Trade Council complaining of what is termed by Australians as "the misuse by American manufacturers and exporters" of the term "F.O.B. New York." This correspondence indicates that a situation has arisen, as a result of the practice complained of, which might easily prove seriously detrimental to American commerce with Australia.

The Australian complaint is that American manufacturers and exporters who have quoted "F.O.B. New York" have interpreted that quotation to include merely delivery within the limits of the port of New York, and not necessarily actual delivery of the merchandise on board the overseas vessel. The Australian contention is that the term "F.O.B. port" has only one meaning, namely, "Free on board overseas vessel" at the port named; and that a quotation "F.O.B. port" means that the purchaser has no charges to meet except those connected with ocean freight, and insurance.

It appears that some American manufacturers and exporters who have quoted prices "F.O.B. New York," or other port, have contented themselves with the delivery of the goods within the limits of the port named, with the result that charges for cartage, lighterage, storage ond other items have been passed on to the Australian purchaser, who had understood that the "F.O.B. port" quotation covered delivery of the goods on the overseas vessel.

There is no question that the original meaning of "F.O.B. port" was "Free on board ship," and that that is the general and usual interpretation among foreigners. The National Foreign Trade Council desires to point out that it is essential to the best practice for American exporters and manufacturers in making an "F.O.B. port" quotation to have it mean "F.O.B. overseas vessel," but in any event the quotation, whatever it is, should be unmistakably clear and explicit. If in quoting prices "F.O.B. port," American exporters or manufacturers have in mind any other delivery than on board overseas vessel, they should make perfectly plain exactly what they mean by the use of "F.O.B. port," and that any charges for cartage, storage, or other services, are for buyer's account.

The Merchants' Association Year Book

The Merchants' Association Year Book for 1919, which covers the year ended April 30, is now being distributed among the members.

The book contains a list of the members and officers of the association and the reports of the president, the secretary, the chairman of the members' council and the heads of the various bureaus. It also includes the by-laws of the association, illustrated by a chart which shows the plan of organization.

The book closes with an alphabetical list of members, pages 106 to 196 inclusive, followed by a classified list of members, pages 200 to 300 inclusive, with an index to classification on pages 301 to 306 inclusive.

The membership of the association on April 30, 1919, was 5881. This result was accomplished by the election of 824 members within the year.

The enrollment is drawn from all of New York City, with about 5500 located in the Borough of Manhattan.

Business Items

The American Shell Co. announces that its name has been changed to that of Gillespie Motor Co. Allied companies and plants are located at Paterson, N. J.

The Kelly Axe Manufacturing Co. has acquired the American Axe and Tool Co., of Glassport, Penn., a concern which has been employing from 700 to 800 men.

The firm of Wesselhoeft & Wisner, engineers, 63 Wall St., New York, announces that John H. Wisner, Jr., has withdrawn from the firm and that Frederick H. Poor has become a partner. The business will be continued as heretofore under the name of Wesselhoeft & Poor.

The James T. Winterling Co., mill and mine contractors, has opened a new office in the Conestoga Building, Pittsburgh, Penn. The organization is comprised of James T. Winterling, president; J. L. McConaghy, vice president, and C. W. Elton, secretary and treasurer. The Winterling Co. represents the following concerns: Wilmington Fiber Specialty Co., Aborn Steel Co., Philadelphia Belting Co., Holyoke Truck Co., Cyclone Fence Co., Acme Waste Co., Forest City Paint and Varnish Co.

The Cleveland Miling Machine Co., Cleveland, Ohio, reports the appointment of H. L. Clark as traveling representative at the New York office, where he will be assistant to R. F. Ingram, manager of that office. Howard Locker also has been appointed traveling representative out of the Detroit office of the company, and where he will be assistant to R. W. Davis, Detroit manager. Mr. Clark will also cover Boston territory, and Mr. Locker will cover Michigan. Both the New York and Detroit offices of the Cleveland Milling Machine Co. have been established for some time.

The Poole Engineering and Machine Co., Baltimore, Md., has opened a branch office in Boston in the old South Building. This new branch office is in charge of Robert W. Catlin.

The Davidson Tool Manufacturing Corp., New York City, has opened a factory and sales office in the Garfield Building, 864-878 Woodward Ave., Detroit, Mich. Alex Hart, Jr., will have charge.

The Lyon Metallic Manufacturing Co., Aurora, Ill., manufacturers of steel shelving, lockers, boxes, cabinets and general steel equipment, announces the opening of a new district sales office in Philadelphia at 519 Bulletin Building, with R. J Nyce in charge.

The Luster Machinery Co., Philadelphia, has moved to 917 Arch St., where it will have 4500 sq.ft. of display space for its representative line of machine tools.

The Chicago Pneumatic Tool Co. has moved its Birmingham office from 801 Brown Marx Building to 1925 Fifth Ave., North, where it will maintain a service station and carry a stock of pneumatic tools, electric tools, air compressors, oil engines, rock drills and repair parts.

The Link-Belt Co. is building a new addition to its Belmont foundry at Indianapolis, and is purchasing the necessary machinery such as rolling mills, sandblast and other foundry equipment. The building will be about 70 ft. wide and 400 ft. long.

The American Instrument Works, Inc., Pittsburgh, Penn., has taken over the Pittsburgh Instrument Works, and has enlarged its field by adding to it the manufacture of dies, tools, jigs, small machine parts, stamping, planning, estimating, etc. The company is under the management of Ernest A. Schurk, secretary and treasurer. F. J. Dark is the consulting mechanical engineer.

The Leland-Gifford Co., manufacturer of sensitive drilling machines and profiling machines, announces the opening of a sales office at 521 Chamber of Commerce Building, Rochester, N. Y., in charge of A. H, Anderson. This company has also recently transferred its Chicago office from 500 Machinery Hall to 621 West Washington Blvd., where it has a store and demonstrating room. C. H. James is in charge of this store and O. H. Leidy has recently been added to the Chicago sales force.

The Lunkenheimer Co., Cincinnati, Ohio, has acquired a factory site at Hartwell, a suburb of Cincinnati, and will build a group of factory buildings to cost $2,500,000. The company will also build 1200 workingmen's homes at an additional cost of $3,500,000. The employees will have the privilege of either buying these homes at cost or renting them at a low figure, sufficient to cover the cost of the investment. Playgrounds, recreation halls, and possibly a picture theater and other features of interest to the employees will be included in the building plans The factory will have a lunchroom, gymnasium, auditorium and other features where the employees can enjoy a period of recreation during the lunch hour.

Personals

F. E. MEYER has accepted a position with the Hart-Parr Co., Charles City, Ia., as chief tool designer.

E. J. KEARNEY, of the Kearney & Trecker Co., Milwaukee, Wis., sailed on Oct. 7 for Europe.

F. H. CRAWFORD has been appointed secretary of the F. H. Niles & Co., Inc., machinery dealers, 233 Broadway, New York.

J. E. HAETTEN was recently appointed to the position of sales manager of the F. H. Niles Co., Inc., machinery dealers, 233 Broadway, New York.

SERGT. EDW. W. KEEFER, who was formerly Eastern traveling representative of the Bearings Co. of America, Lancaster, Penn., and who enlisted for service in May, 1917, and saw service in several major engagements in France with the 28th Division, has returned to his former position.

FRED J. HOLDEN has recovered from a long illness and has resumed his connection with B. M. Jones & Co., 192 Chambers St., New York City.

G. P. GOODMAN, who for several years represented the Hisey-Wolf Machine Co. in the East, has taken charge of the portable tool department of the F. H. Niles Co., Inc., machinery dealers, 233 Broadway, New York.

JOEL B. IVES, of the engineering and contracting department of the American Steel Export Co., Woolworth Building, New York, has gone to Italy to confer with the Italian agents of the export company, M. Ferraris & Co.

V. B. TAYLOR, for some time connected with the general sales department of the Lyon Metallic Manufacturing Co., of Aurora, Ill., has been appointed manager of the Pittsburgh district sales office, which is located in the Oliver Building.

EARL E. EBY, sales manager for the Hyatt Roller Bearing Co., Industrial Bearings Division, New York City, has been appointed to the board of directors of Hyatt, Ltd., a new company formed to market the Hyatt Bearing in Europe. G. O. Helmstaedter, formerly Chicago district manager, has been promoted to succeed Mr. Eby as sales manager.

FIRST LIEUT. J. W. BAGLEY has recently been appointed Cleveland representative of the Erie Crucible Steel Co., Erie, Penn. Prior to his entering the service, Lieutenant Bagley was with the Sherwin-Williams Co. He served in France with the 90th Division, which saw some of the severest fighting in the Chateau Thierry, St. Mihiel and Argonne battles.

GEORGE W. CRANE has been appointed by the Seneca Falls Manufacturing Co., Inc., Seneca Falls, N. Y., the successor to Marshall J. Root. Mr. Crane was formerly with the Pierce, Butler & Pierce Manufacturing Co.; he started with them in 1900 as timekeeper, later becoming salesman and finally assistant sales manager.

JOHN J. CREHAN has joined the inspecting department of the Hart-Parr Co., Charles City, Ia. He was recently assistant chief inspector at the Dodge Motor Car Co., Detroit, Mich.

E. W. CLARK has been promoted to superintendent of the construction department of the Franklin open-hearth plant of the Cambria Steel Co. Mr. Clark is succeeded by H. E. Townsend, assistant superintendent.

E. W. THOMPSON, for the past 11 years a representative of the Standard Tool Co., in Illinois, has joined the sales force of the Davidson Tool Manufacturing Corp. He will have an office in Chicago and will represent this company in that territory.

NELSON B. GATCH has been appointed by the Chicago Pneumatic Tool Co., Chicago, Ill., district manager of sales, succeeding L. C. Sprague. Mr. Gatch will have his headquarters at 52 Vanderbilt Ave., New York City.

HARRY T. CALKINS has joined the sales force of the Tacony Steel Co., Philadelphia, Penn. Mr. Calkins will be connected with the company's New York office, but will sell in Connecticut exclusively.

FREDERICK J. MYERS, of Johnstown, Penn., has been named assistant general manager of the Lorain Steel and Construction Plant, Lorain, Ohio. He is a former employee of the Cambria Steel Co., Johnstown, and is a graduate of St. Francis College, Loretto, Penn.

HOWARD MERTON has been appointed assistant superintendent of the Tata Iron and Steel Co., Jamshedpur, British India. Mr. Merton has signed a contract with this company for three years and will leave in a few weeks to take up his new position. The main office of the company is in England with branch offices in this country.

DAVID E. DARRAH, recently secretary of the Y. M. C. A. at Charles City, Ia., has been appointed manager of sales promotion at the Hart-Parr Co., Charles City, Ia. Mr. Darrah will work with Mr. Frederickson, general sales manager, in the promotion of ways and means of strengthening the sales organization over the entire Hart-Parr Co. territory, both local and foreign.

J. E. JOHNSON, manager of the Waterloo Gasoline Engine Co., Waterloo, Ia., has resigned and will be succeeded by H. A. Head of Moline, Ill. Mr. Johnson will retain his position as secretary and treasurer of the company, which he has held for the past 12 years. Mr. Head has been in the farm implement manufacturing business for the past 28 years.

H. P. CAMP, who for the past four years has been engaged by the Western Cartridge Co. as consulting and equipment engineer and who was previously employed as equipment engineer with the Remington Arms Union Metallic Cartridge Co., Bridgeport, Conn., has taken a position as staff engineer with the L. V. Estes, Industrial Engineers, of Chicago, Ill.

GEORGE W. SNYDER, who has for several years represented the Haynes Stellite Co., in western Ohio, has taken a position with the Davidson Tool Manufacturing Corp. Mr. Snyder will represent this company as sales engineer in western Ohio and Indiana, and will have an office in Cincinnati, Ohio.

R. W. HERRICK, formerly efficiency engineer of the Hart-Parr Co., Charles City, Ia., has been promoted to the position of chief inspector. Mr. Herrick was at one time toolroom foreman and later production director of the Ford Motor Car Co. He has also been connected with the Packard Car Co., Continental Motors Co., and the General Motors Co.

Obituary

HENRY W. ANDREWS, of the firm of Andrews & George, Tokyo, Japan, died Aug. 16, 1919.

JAMES THEODORE CALLANAN, aged 55, owner of the Parkersburg Engine Co., died at his home in Parkersburg, W. Va., Sept. 28, of heart trouble. He began business in this city with the Parkersburg Machine Co., which later developed into the Parkersburg Engine Co., manufacturing gas engines and oil field tools. He was prominent in the business, club, social and fraternal life of the city.

Export Opportunities

Augusto Malacria & Co., Genova, Italy, has sent a communication to the New York Chamber of Commerce, stating that it wants to get in touch with American firms, manufacturing motor boats of iron or motors for motor boats, that would like to be represented in Italy.

The Thomas Export Corp., 120 Broadway, New York City, which has European branches, desires to get in touch with American machinery manufacturers who want to be represented in Europe. Frederick Meron, M. E., E. E., is the manager of the engineering department. He is a graduate of a technical school in Switzerland and he also graduated as an electrical and mechanical engineer at the University of Liege, Belgium. During the war Mr. Meron was connected with the U. S. Government explosive plant "C" at Nitro, Va.

Catalogs Wanted

The Gale-Sawyer Co., at South Weymouth, Mass., is making extensions and alterations in its plant and office, and desires to be placed on the mailing lists of machine-tool manufacturers, in order that it may receive catalogs and other literature applicable to its business of manufacturing cutters, reamers and small tools.

Machine Tools Wanted

D. C., Washington—The Bureau of Supplies and Accounts, Navy Department, will soon receive bids for furnishing machine tools as follows:

Schedule No. 4585—24 forced-draft blowers, delivery Brooklyn, N. Y., Norfolk, Va. and Mare Island, Calif.

Schedule No. 4588—1 electric welding machine, delivery Washington.

Schedule No. 4685—7 bench lathes, delivery Newport, R. I.

Schedule No. 4691—1 band resaw, delivery San Diego, Calif.

Schedule No. 4698—7 polishing and finishing machines, delivery Newport, R. I.

Schedule No. 4704—84 metal sifting saws, delivery South Brooklyn, N. Y.

Schedule No. 4719—1 motor-driven washer press, delivery Brooklyn, N. Y.

Schedule No. 4736—8 balancing rolls, clamps and countershafts, delivery Philadelphia, Penn.

The following concerns are in the market for machinery and machine tool:

Conn., Bridgeport—The American Chain Co., Inc., Connecticut Ave. near Lagan St.—a 14 in. lathe and a 20 ton double action press (used).

Mass., Boston—T. G. Plant Co., Jamaica Pl.—shoe machine equipment.

Mass., Southbridge—The American Optical Co., 14 Mechanic St.—a No. 1 Brown & Sharpe hand screw machine to take 5/8 material (used).

D. C., Washington—C. S. Hughes, Purchasing Agent of the United States R. R. Administration—a double seated, electrically driven, boring mill (used).

Md., Greensboro—The Helvetia Milk Condensing Co., Highland, Ill.—condensing machinery for its plant to be erected here.

Md., Baltimore—The Pioneer Hardwood Flooring Co., President and Fleet St.—planing and polishing machinery.

Md., Baltimore—The Sheppard Supply and Equipment Co., 37 South Charles St.—a 12 to 14 in. lathe (used).

N. J., West Elizabeth (Elizabeth P. O.)—The Heddon Iron and Construction Co.—a 5 ton electric hoist.

N. Y., New York (Borough of Manhattan)—M. Hausle, 3307 3rd Ave.—cider mills and presses and pasteurizers.

N. Y., New York (Borough of Manhattan)—Perin & Marshall, Engr., 2 Rector St.—rollers, roller scrapers, hot saws, shears and bloom shears, for the Scullin Steel Co., 6700 Manchester Ave., St. Louis, Mo.

N. Y., New York (Borough of Manhattan)—The Railway Steel-Spring Co., 30 Church St.—an automatic machine for accurately grinding small wire compression coil springs on both ends at one time, sizes of springing 3/8 to 8 in. long, 1/8 to 3 in. diameter and 1/16 to 1/2 in. wire stock.

N. Y., Rochester—The Allen Woolen Mills., Elton and Russel St.—$75,000 worth of mechanical equipment. A. Allen, Pres.

Penn., Allentown—C. Spangler, 102 South 3rd St.—a cylinder grinder, bolt cutter and bench miller.

Penn., Bradford—Bovaird & Co., 181 Main St.—a 4 ft. radial drill.

Penn., Koppel—The Koppel Industrial Car and Engineering Co.—one 10 ton bridge crane; one 5 to 18 ton Gentz crane; 1 Bliss No. 6 A power press and 1 A No. 3 mill press.

Penn., New Kensington—The Kennez Machinery Co., 5th and 13th St.—a boring machine, lathes and a radial drill.

Penn., Philadelphia—The Motor Parts Co., 847 North Broad St.—a 10-24 in. or 12-36 in. Landis grinder.

Penn., Philadelphia—The Philadelphia Silk Spinning Mill, Masher and Westmoreland St.—a bale press (used).

Penn., Philadelphia—Thompson Bros. Co., 125 North 5th St.—a key seater.

Penn., Pittsburgh—The United States Chain and Forging Co., Union Arcade—a surface grinder for table about 24 x 48 in.

Penn., Reading—The Reading Oil Corporation, 612 Washington St.—machine tools.

Miss., Lumberton—The J. H. Miner Saw Works Co.—a 36 in. drill press (new or used).

Tenn., Ethridge—The E. M. Gant Co.—automatic and hand screw machines, 5/8 in. capacity and one or two 20 in. back geared drilling machines (new or used).

W. Va., Charleston—B. E. Andre, Court and Virginia St.—screw cutting lathes and power drills.

Ill., Chicago—The Central Bag Manufacturing Co., 3622 Iron St.—special machinery for the manufacture of cloth bags.

Ill., Chicago—The Donath Hardware Co., 9304 Muskegon Ave.—a rotary swager, 1 1/2 in. capacity and upwards (new or used).

Ill., Chicago—M. Robinseau, c/o Z. E. Smith, Arch., 5501 Prairie Ave.—light repair shop equipment.

Ill., Quincy—The Otis Elevator Co., Walton Heights—a No. 14-18 L. Besley grinder, with 26 in. discs and 18 in. chuck for ring wheel (used).

Ind., Terre Haute—The Automatic Machine Co., Prairieton Ave. and Demorst St.—1 Peerless 9 x 9 in., belt driven, power hack saw (new).

Mich., Detroit—W. D. Midgley, 753 Grand River Ave.—equipment for automobile repair work.

Mich., Detroit—The Newbro Gallogly Corporation, 35 Milwaukee Ave., W.—machine tools for light automobile repair work.

Mich., Detroit—The Packard Motor Car Co., Grand Blvd.—a 5 ton travelling crane.

Mich., Detroit—The Puritan Machine Co., 10th and Cherry St.—complete machine shop equipment.

Mich., Detroit—The Schweppe & Wilt Manufacturing Co., Mt. Elliott and Conant St.—a hand punch press for 1/8 in. sheet steel (used).

Mich., Detroit—Selik Bros., 652 24th St.—lathes, grinders and a drill press.

Mich., Dowagiac—The Rudy Furnace Co.—an electric crane.

Mich., Kalamazoo—Fuller & Sons, Pitcher St.—machine shop equipment for finishing transmission gears.

Mich., Plymouth—The H. S. Lee Foundry and Machine Co.—2 cranes and a blower system.

Ohio, Akron—The B. F. Goodrich Co., Cherry and Canal St.—a motor driven dry grinder (new).

Ohio, Bellevue—The Lein Iron Works Co.—a locomotive crane with 15 tons capacity.

Ohio, Canton—The Everhard Manufacturing Co.—a small lathe (new or used).

Ohio, Canton—The Kittoe Boiler and Tank Co., Camden Ave., S. W. and Pennsylvania R. R.—a 24 in. lathe.

Ohio, Cincinnati—The Warner Elevator Manufacturing Co., 2613 31st St.—a 26 in. shaper and vertical boring mill.

Ohio, Cleveland—The Ohio Forge Co., 2155 East 92nd St.—a forging press.

Ohio, Cleveland—The Standard Equipment Co., Lorain Ave. and West 106th St.—a power hack saw (new).

Ohio, Columbus—The Columbus Heating and Ventilating Co., 425 West Town St.—a 26 in. lathe.

Ohio, Columbus—The Osborne-Sexton Machine Co., 4th and Russell St.—1 set of 10 ft. bending rolls, to take 1/2 to 5/8 in. plate, with motor drive for 220 direct current motor.

Ohio, Cuyahoga Falls—The Marathon Tire and Rubber Co.—an 18 in. lathe and a 24 in. shaper (new or used).

Ohio, Findlay—The Adams Axle Co.—a 1500 lb. hammer (new or used).

Ohio, Newark—The Wherle Co.—$25,000 worth of grinders, power presses, polishers, boring mills, radial drills, milling and cutting machines and other similar equipment (new or used).

Ohio, Norwood (Cincinnati P. O.)—The Dalton Adding Machine Co.—several No. 00G and 0G B. & S. automatic screw machines; 1 No. 0 automatic turret forming machine and a No. 00 automatic cutting-off machine (new).

Ohio, Toledo—The Acme Tool Co.—a No. 3 vertical mill.

Ohio, Toledo—A. Bentley & Sons Co., Engrs., 201-31 Belmont Ave.—about $100,000 worth of miscellaneous machinery, tools and equipment for factory construction.

Wis., Milwaukee—The Evinrude Motor Co., 279 Walker St.—drill presses, planers, lathes, etc.

Wis., Milwaukee—G. Hummel, 1905 Walnut St.—a 20 in. drill press, a small bench lathe and a large lathe.

Wis., Milwaukee—The A. O. Smith Corporation, 27th and Keefe St.—2 swaging machines, similar to Aetna 4A (used).

Wis., Milwaukee—The Wordan Allen Co., Pt. Washington Rd.—a plate shear to take up 72 in. plates, 1 in. thick, and an angle shear to take 6 x 6 x 1 in. to 8 x 8 x 1 in. angles, both motor driven (used).

Wis., Racine—The Walker Manufacturing Co., Hamilton and Michigan St.—foundry equipment.

Wis., Schleisingerville—The Vim Tractor Co., 835 Caswell Blk., Milwaukee—lathes, drill presses, and planers for its plant, to be erected here.

Kan., Atchison—The Cooper Foundry Co., 1001 Commercial St.—a lathe with 14 in. swing, 7-10 ft. bed (new or used).

Mo., Joplin—The Joplin Supply Co., 3rd and Wall St.—lathes.

Mo., St. Louis—The Mineral Refining and Chemical Corporation—chemical manufacturing equipment.

Mo., St. Louis—The Steiner Manufacturing Co., 4100 North 21st St.—a 2 in. automatic screw machine; a J. & L. or Acme flat turret lathe chucking equipment; a high speed bench drill; a shaft grinder for 1 1/2 x 20 in. shafts and a piston ring style surface grinder to grind up to 4 in. steel discs (used).

Neb., Omaha—C. A. Anderson, 1107 Jackson St.—drills, lathes, blacksmith equipment, etc.

Tex., San Antonio—The Alamo Iron Works, 130 Santa Clara St., is interested in companies manufacturing steel forms for use in constructing round silos.

Calif., Los Angeles—The Board of Education—manual training equipment.

Colo., Pueblo—The Steam Motor Car and Manufacturing Co.—2 turret lathes, 8 in. swing or radius, 6 ft. bed, with geared heads for heavy duty and one 1/26th in heavy duty crank drive, compound feed shaper.

Nev., East Ely—The Northern Nevada R. R.—a cylinder grinder, a crank shaft turner, grinding machines and other equipment (new or used).

Wash., Spokane—The Churchill Safe and Lock Co., Jones Bldg.—an engine lathe with 14 to 36 in. swing between centers (new or used).

Alta., Calgary—The Precision Machinery Co., 319 6th Ave., E.—1 cylinder grinder, Heald or similar (used).

Ont., Hamilton—The Frost Steel and Wire Co., Sherman Ave., N.—drawing and fence machinery.

Ont., Toronto—W. and J. G. Greey, 6 Church St.—a 84 in. boring mill (used).

Mex., San Juan de Lethran—H. W. Beers Electric Co., S. A. Mexico, D. F., Apartado 1932—power driven lathes, drill presses, shapers, power driven hack saws and shears, foot power punches and shears, machinists hand tools and mechanical novelties.